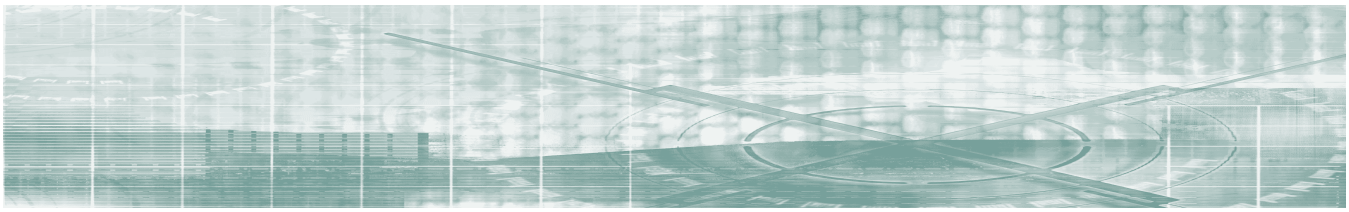

Cleo® 3780Plus®

User's Guide

June 2000

CLEO

Cleo 3780Plus User's Guide

Release 06010 – June 2000

RESTRICTED RIGHTS
Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subparagraph (C)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013. Manufacturer is:
Cleo Communications
4203 Galleria Drive
Loves Park IL 61111 USA

Cleo Communications reserves the right to, without notice, modify or revise all or part of this document and/or change product features or specifications and shall not be responsible for any loss, cost or damage, including consequential damage, caused by reliance on these materials.

This document may not be reproduced, stored in a retrieval system or transmitted, in whole or in part, in any form or by any means (electronic, mechanical, photo-copied or otherwise) without the prior written permission of Cleo Communications, Inc.

© 2001 Cleo Communications All rights reserved.

Cleo, 3780Plus, and *SYNCcable+* are registered trademarks of Cleo Communications
All other brand names are trademarks or registered trademarks of their respective owners.

About Cleo Communications

Cleo Communications provides software, hardware, and services to help organizations distribute centralized host-based computing resources to their branch offices, departments, and other remote locations. Customers rely on our products to:

- Provide remote multi-user access to host applications and data.
- Distribute host-based electronic documents throughout the enterprise.
- Print and view host-based documents at remote sites.
- Transfer data between computer systems at all points in the network.

Cleo Communications has been manufacturing high-speed PC-to-mainframe data communications products since 1981. More than 100,000 of our products are installed on systems worldwide. Cleo combines the most advanced data communications hardware and software with complete documentation and maintenance. In addition, all users get continuing personal support from our technical specialists, and we back all of our products with a 30-day money-back guarantee and a full 12-month warranty. We're committed to providing reliable, cost-effective, high-performance solutions.

Cleo Technical Support Subscription Program

An annual technical support subscription includes the following:
Technical Support via Telephone. Technical Support Analysts are available to assist with installation, testing and troubleshooting M-F from 8am-5pm CST. The technical support area operates on a callback basis. The next available Support Analyst will return voicemail left at our toll-free support line, 866-444-2536.
Technical Support via E-mail and Fax. Questions and support requests sent to support@cleo.com (e-mail) or 1-815-654-8294 (fax) are entered in the same queue as telephone requests and will be returned by e-mail, fax or telephone per your request.
Free Software Upgrades and Sample Scripts. Enjoy 24 hour a day access to upgrades and new versions of your software, or access sample scripts that can simplify your scriptwriting when you have an exclusive, subscriber's area password.

Standard Support Services (Available Without Subscription)

Subscriptions include the standard support services available:
Website Support. Cleo's FAQ knowledge base includes detailed answers and technical bulletins on all software and hardware questions and is continually growing.
Automated Test Lines. Instructions for testing your Cleo installation using automated test lines are located in the 'Readme.txt' file packaged with your software.
One-Year Hardware Warranty. All Cleo hardware is warranted for one year from date of purchase. In addition, users may purchase one additional piece of hardware (without software) for back-up purposes.

Table of Contents

Before You Begin

The Documentation ii

Documentation Conventions iii

A Brief History of 3780 iv

What is Cleo 3780Plus? v

Features vi

Specifications vii

Related Documentation viii

Chapter 1. Operation

1.1 The 3780Plus Command Line 1-2

1.2 Starting 3780Plus 1-5

1.3 The 3780Plus Command Menu 1-6

1.4 Connecting to the Remote System 1-7

1.4.1 Automatic Dialing 1-7

1.4.2 DTR-Controlled Dialing 1-7

1.4.3 Manual Dialing 1-8

1.4.4 Automatic Answer 1-8

Chapter 2. Configuration

2.1 Displaying and/or Changing Configuration Settings 2-2

2.2 The Configuration Parameters 2-3

2.3 Configuration Files 2-9

2.3.1 Creating Configuration Files 2-9

2.3.2 Modifying Configuration Files 2-9

Chapter 3. 3780Plus Commands

3.1 ANswer - Automatic Answer 3-3

3.2 AT - Send an 'AT' String to the Modem 3-4

3.3 AUtodial - Automatic Dial 3-5

3.4 BInary - Transmit Binary File(s) 3-7

3.5 BRanch - Branch in Job/Script File Based on Condition 3-9

3.5.1 BRanch ON|NOT *status* TO *label* 3-10

3.5.2 BRanch ON|NOT *return_code* TO *label* 3-10

3.5.3 BRanch ON|NOT SIZE [<|=|>] *file_size* TO *label* 3-11

3.5.4 BRanch ON|NOT %COUNTER*c*|$COUNTER*c* <|=|> *number* TO *label* 3-11

3.5.5 BRanch ON TRUE TO *label* 3-11

3.5.6 BRanch Command Tips 3-12

3.6 COnfig - Display or Change Configuration 3-13
3.7 +COUNTER - Increment Counter 3-15
3.8 -COUNTER - Decrement Counter 3-16
3.9 DAta - Data Mode 3-17
3.10 EOt - Transmit an End Of Transmission 3-18
3.11 EXecute - Execute Commands from a Job/Script File 3-19
3.12 HElp - Display 3780Plus Command Information 3-20
3.13 INterrupt - Interrupt Receive File 3-21
3.14 JOb - Create or Scramble a Job/Script File 3-22
3.15 KEy - Transmit a Keyboard Message 3-24
3.16 LOg - Open, Close, Display, or Write to Log File 3-26
3.17 MOnitor - Open or Close a Serial Line Monitor 3-27
3.18 PRint - Receive File(s) and Spool to Printer 3-29
3.18.1 UNIX/ VMS PRint Command 3-32
3.18.2 MS-DOS PRint Command 3-32
3.19 QUit - Exit 3780Plus 3-33
3.20 REceive - Receive File(s) 3-35
3.21 SCreen - Receive File(s) and Display on Screen 3-37
3.22 SLeep - Pause Specified Seconds 3-39
3.23 STart - Display or Initialize Counter 3-40
3.24 SYstem - Execute an Operating System Command or Application Program 3-42
3.25 TAble - Display or Change Translation Table(s) 3-43
3.26 TExt - Transmit Text File(s) 3-44
3.26.1 File Naming 3-45
3.27 TOken - Enable, Disable, Display, or Set Token Variables 3-47
3.28 VOice - Disconnect Phone Line and Disable Autoanswer 3-49
3.29 XX - Post Current 3780Plus Information 3-50
3.30 ## - Job/Script Comment Line 3-51

Chapter 4. 3780Plus Tutorial

4.1 Retail Sales 4-2
4.2 Remote Job Entry 4-3
4.3 Insurance Batch Transactions I 4-4
4.4 Insurance Batch Transactions II - Using Tokens 4-6
4.5 Insurance Batch Transactions III - Using Environment Variables 4-7

Appendix A. Modem Support

A.1 Internal Cleo Modems A-2
A.2 External Autodial Modems A-3
A.2.1 AT Command Set Modems A-3
A.2.2 Motorola/UDS BSC Modems A-5
A.2.3 Synchronous Autodial Language (SADL) Modems A-6
A.2.4 CCITT V.25bis Modems A-8
A.3 External Non-Autodial Modems A-9
A.4 Modem Eliminators A-10
A.5 Null Modems A-11

Appendix B. File Formats

B.1 Configuration File B-2
B.2 Job/Script File B-3
B.3 Log File B-4
B.3.1 The Autodial/Answer/AT Status Line B-4
B.3.2 The Transmit/Receive Status Line B-6
B.3.3 Status Messages B-9
B.4 Character Translation Files B-17
B.4.1 ASCII to EBCDIC Translation File B-17
B.4.2 EBCDIC to ASCII Translation File B-17
B.5 Video Display File B-19
B.5.1 Screen Formatting Information B-19
B.5.2 3780Plus Messages B-19
B.5.3 3780Plus File Names B-19
B.5.4 Modem Setup Strings B-20
B.5.5 Modem Result Messages B-20
B.6 Monitor File B-21
B.6.1 Using the Monitor B-21
B.6.2 Sample Monitor B-21
B.7 Vertical Forms File B-30
B.8 Baud Rate Definition File B-32

Appendix C. Multipoint Operation and Device Selection

C.1 Multipoint Operation C-2
C.1.1 3780 Multipoint C-2
C.1.2 2780 Multipoint C-2
C.2 Device Selection C-3
C.2.1 3780 Device Selection C-3
C.2.2 2780 Device Selection C-4

List of Tables

1.1 3780Plus Initialization Errors and Exit Codes 1-6
2.1 Configuration Parameters 2-3
3.1 Printer Escape Sequence Translations 3-31
A.1 SADL Programmable Options A-6
B.1 Autodial/Answer Completion Status Messages B-5
B.2 Receive Completion Status Messages B-7
B.3 Transmit Completion Status Messages B-8
B.4 3780Plus Command Status Messages B-9
B.5 Protocol Characters B-23
B.6 ASCII to EBCDIC Translation B-24
B.7 EBCDIC to ASCII Translation B-26
C.1 3780 Device Selection Characters C-3
C.2 2780 Device Selection Characters C-4

Before You Begin

Before you get started, take a moment to read this section. It provides an overview of the following topics:

- The documentation
- Documentation conventions
- A brief history of 3780
- What is 3780Plus?
- Related documentation

The Documentation

This Cleo 3780Plus manual is comprised of several sections.

User's Guide

The *Cleo 3780Plus User's Guide* provides background information on the 2780 and 3780 terminals and describes 3780Plus features, commands, configuration options, job scripting language, diagnostic tools, and terms used throughout the manual.

Installation Guide

The *Cleo 3780Plus Installation Guide* section provides instructions on installing the hardware included with your 3780Plus packages and installing Cleo 3780Plus to your hard disk and configuring your system for 3780Plus operation. It also describes any execution instructions not covered in the *Cleo 3780Plus User's Guide* and provides help for troubleshooting SYNCcable+ installation problems.

AllSync AT Command Set

The *AllSync AT Command Set* section describes the commands for autodialing, auto-answering, configuring, and operating AllSync's asynchronous modem. This section is included only with AllSync packages.

Application Programmer's Interface

The *Cleo 3780Plus Application Programmer's Interface* section contains the information you need to write application programs using 3780Plus's own Integrated Application Programmer's Interface. This section is provided as an add-on option only.

Documentation Conventions

The following documentation conventions are used throughout this manual:

Italics	Italicized words in this format identify the titles of manual sections.
bold	Bold type is used for cross-references to other chapters within the manual or to other sections within a chapter.
italics	Italicized words in this format represent substituted items. Substitute your own file name, device name, phone number, etc., for the italicized word. File names may optionally specify a disk drive and/or path name as follows: *drive:/pathname/filename*.
[ ]	Brackets represent an optional parameter. Do not include the brackets when entering the option.
|	Vertical bars separate option selections. Select only one of the options. Do not include the bar when entering the option.
...	An ellipsis indicates the item may be repeated.
KEYNAME	A key name in this format, for example **ENTER**, refers to a specific key on your terminal's keyboard. Some keyboard commands require that you press one key and hold it down while you press one or more other keys. These are called combination keystrokes. To indicate this, key names are shown together with a + sign between them (for example, **CTRL+C**). While holding down the first key, press the other key(s).
0x*nn*	A number preceded by 0x (for example 0x20) indicates a hexadecimal value.

A Brief History of 3780

The IBM 2780 Data Transmission Terminal was introduced in the late 1960's to enable large data processing consumers to consolidate data processing operations into one large mainframe. The 2780 terminal could be configured with the following peripheral devices: card reader, card punch, and printer. Files were transmitted to the host mainframe by means of the card reader, and received files were directed to the card punch or line printer.

The IBM 3780 Data Communications Terminal, an improved version of the 2780 terminal, was introduced in 1972. The 3780 terminal included a terminal console in addition to the card reader, card punch, and printer of 2780. The 3780 protocol also offered improved speed and flexibility over the 2780 protocol.

IBM's 2780 and 3780 binary synchronous protocols are fast and flexible means of transferring large amounts of data in a leased or public carrier data line environment. The 2780/3780 protocol provides extensive error checking to ensure error-free transmission and reception of data files.

3780 BSC Features

Transparency/Non-transparency - 2780/3780 may transmit and receive files in transparent or non-transparent mode. In transparent mode, files are normally transmitted and received "as is" with no character translation. This allows the full range of characters or data to be sent. In non-transparent mode, files are normally translated from the ASCII character set to the EBCDIC character set before transmission and reconverted to ASCII upon reception.

Space Compression (non-transparent 3780 only) - The 3780 protocol allows spaces to be removed before transmission and reinserted during reception for increased data throughput on the communications line.

Point-to-point/Multipoint - 2780/3780 supports transmissions between two stations (point-to-point) or among multiple stations (multipoint) in a network arrangement. In multipoint mode, one processor is designated as primary and all network transactions occur through this node. Other terminals, designated as secondary, are assigned unique terminal addresses so that all data may be "routed" through the network to the appropriate device.

What is Cleo 3780Plus?

Cleo 3780Plus enables your computer to emulate (act like) an IBM 3780 or 2780 terminal. With 3780Plus, you can transmit files to and receive files from any other micro, mini, or mainframe computer that supports 3780/2780 bisynchronous protocol.

The 3780Plus program provides you with a menu of commands for making the connection, transmitting and receiving data, creating and executing job (script) files, changing configuration parameters, controlling and monitoring the transmission line, and executing operating system commands.

3780Plus allows you to transmit and receive files interactively or unattended. In interactive mode, you enter transmit commands for disk file transmission to occur. Between transmissions the line is monitored for incoming messages. These messages are stored to disk or displayed on the screen or printer as desired. In unattended mode, all commands are read directly from a job file stored on disk, and no operator interaction is necessary.

3780Plus defaults to a standard 3780 configuration. This configuration may be modified interactively at operation time. You may create one or more custom configuration files which may be invoked either when 3780Plus is executed or by issuing the change configuration command within 3780Plus.

A serial line monitor allows you to view or save to disk the 3780 protocol characters and data files as they are sent and received. This is a powerful diagnostic tool for isolating communications problems.

3780Plus allows you to execute virtually any operating system command or application without leaving the program.

Features

- IBM 3780/2780 terminal emulation
- Full IBM binary synchronous protocol
- Transparent (binary) and non-transparent (text) file support
- Interactive or job (script) file operation
- On line diagnosis of communications problems
- Local printer support
- File naming
- Configurable ASCII/EBCDIC character translations
- Environment variable support
- Operating system access
- Automatic dial support with CLEO internal modems and a wide variety of external modems

Specifications

Terminals Emulated:	IBM 3780/2780
Line Discipline:	IBM Binary Synchronous Communication (BSC) protocol
Data Rate:	300 through 115,200 bps (bits per second)
Bell Modems:	212 (1200 bps), 201 (2400 bps), 208 (4800 bps), 209 (9600 bps)
CCITT Modems:	V.21 (300 bps), V.22 (1200 bps), V.22bis (2400 bps), V.26bis (2400 bps), V.27ter (4800 bps), V.29 (9600 bps), V.32 (9600 bps), V.32bis (14,400 bps), V.34 (28,800 bps)
Transmission Code:	EBCDIC
Error Detection:	CRC-16
Transmission Line:	Leased or switched (dial-up)
Link Control:	Point-to-point or multipoint
Channel Type:	Half or full duplex 2 or 4-wire lines
Data Mode:	Transparent or Non-transparent
Terminal Type:	Primary or Secondary
Terminal Identification:	Up to 20 characters
Local printer:	Supported
Space Compression/Expansion:	Supported
Extended Enquiry Retry Feature:	Supported
Multiple Record Transmission:	Supported
Wait Acknowledge (WACK) Message:	Supported
Temporary Text Delay (TTD) Message:	Supported
Reverse Interrupt (RVI) Message:	Supported
Device Selection:	Supported
Printer Channel Control:	Supported
Automatic Answer:	Supported
Automatic Disconnect:	Supported
Automatic Dial:	UDS/Motorola BSC, SADL, CCITT V.25bis, and Hayes AT Command

Related Documentation

This manual is not intended to provide a comprehensive discussion of 3780 BSC protocols. Section **B.6 Monitor File** in **Appendix B - File Formats** lists 2780/3780 protocol characters and a brief description of the function of each. If more detailed information is desired, the following references are recommended:

Component Information for the IBM 3780 Data Communications Terminal, GA27-3063-3.

2780 Data Transmission - Terminal Component Description, GA27-3005-3.

Chapter 1.
Operation

This chapter explains how to start a 3780 emulation session and connect to your host system. The following topics are covered:

- The 3780Plus command line
- Starting 3780Plus
- The 3780Plus command menu
- Connecting to the remote system

Prior to executing 3780Plus, read through the appropriate *Installation* section for instructions on the setup and installation of your Cleo supplied hardware and software. 3780Plus will abort with an error message if the required hardware is not installed.

1.1 The 3780Plus Command Line

The command line used to execute 3780Plus is:

3780Plus [-D *device*] [-C c*onfigfile*] [-J *jobfile*] [-LO|-LA|-LN]
[-A*address*] [-B *baudrate*] [-E] [-F] [-H] [-I*irq*] [-K [*token* [*token*]..]] [-M [*monitorfile*]] [-N] [-R] [-S] [-T] [-U] [-W]

The most commonly used options are displayed on the first line above. Special case options are displayed on the second line above; these options are rarely used. 3780Plus may be executed without options or, if required, with only the -D option. The options are described below:

-D *device* is a device specification. This is normally used to specify the COM port, tty port, or channel that SYNCcable or SYNCcable+ will attach to. The **Software Execution** description in the appropriate *Installation* section will tell you if this option is required for your system.

-C *configfile* is an option to select a custom configuration file. This option allows you to run with settings other than the default configuration. For instance, the file 2780 included on your 3780Plus diskette may be used to run the default 2780 configuration with the command line:

3780Plus -C 2780

You may create or change configuration files within 3780Plus with the COnfig command (see **3.6 COnfig - Display or Change Configuration** in **Chapter 3 - 3780Plus Commands**).

Note: If no -C *configfile* option is specified, the default configuration is taken from the default.cfg file. If the default.cfg file does not exist, 3780Plus runs with its own default 3780 configuration.

-J *jobfile* is an option to execute a custom job file. This option allows you to run a series of 3780Plus commands without operator intervention. You may create custom job files within 3780Plus with the JOb command (see **3.14 JOb - Create or Scramble a Job/Script File** in **Chapter 3 - 3780Plus Commands**) or with a standard text editor.

-LO|-LA|-LN are optional commands for log file control. Only one of the three options should be selected. 3780Plus includes the ability to log all transactions and user messages to the log file 3780.LOG. This log file is helpful in checking the status of the prior communications session. See **B.3 Log File** in **Appendix B - File Formats** for the log file format.

The -L command allows you to select how 3780.LOG is used:

-LO creates the log file 3780.LOG if none exists or overwrites 3780.LOG if it does exist. This is the recommended option;

-LA creates the log file 3780.LOG if none exists or appends to 3780.LOG if it does exist;

-LN preserves the existing log file 3780.LOG. A log file is not created and no transactions are recorded.

If 3780Plus is executed without the -L option, the default log file mode is used. The default mode is: If a log file exists, all transactions are appended to this file. If no log file exists, a log file is not created and the transactions are not recorded.

-A*address* is an option generally used to specify the I/O address set on your internal MS-DOS communications card. Note: There is no space between the -I and the specified address. Normally, the address is detected automatically, so this parameter is not used. If 3780Plus cannot find the address, it exits with an error message or is unable to dial or transmit. If this happens, supply a base address with the -A option. For example:

```
3780Plus  -A300
```

forces a base address of 300 (Hex). The communications card must be set at the address specified. See the appropriate *MS-DOS Installation* section for allowable address values. This option is valid only on MS-DOS versions.

-B *baudrate* is an option to set the asynchronous baud rate on SYNCcable+. For example:

```
3780Plus  -D  /dev/tty1a  -B  9600
```

sets the tty port's async baud rate to 9600 bits per second. The allowable rates are 4800, 9600, 19200, 38400, 57600, and 115200 bps. For maximum throughput, the asynchronous baud rate should be set equal to or higher than the baud rate of your synchronous modem. If the -B option is not specified, the rate is set to 4800 bps.

Note, not all machines can handle speeds of 38,400 bps and above. Only 3780Plus for DOS and HP9000 support these baud rates as-is. For UNIX-based systems and add-on multiport boards or terminal controllers, the baud.ovr file may be created to specify IOCTL baud rate definitions. See **B.8 Baud Rate Definition File** in **Appendix B - File Formats** for details. If the machine does not support the specified speed, 3780Plus will post an "Unsupported Baud Rate" message and exit with exit code 26 or post an "Error Writing Code to SYNCcable+" message and exit with exit code 10. If the machine supports the speed but cannot handle the traffic, the communications will be slowed by errors (use the XX -S command to determine error counts).

-E is an option to enable clocking. This option is valid only with PC/SIB and SYNCcable+. Clocking allows you to connect directly to another local system without the use of modems or modem eliminators. The clock speed is selected with the COnfig modulation parameter.

-F is an option to disable incoming file names. This option is particularly important with UNIX, XENIX, and AIX operating systems since existing files will otherwise be overwritten by incoming files named by a remote 3780Plus system.

-H is an option to prevent 3780Plus from dropping the line when a Hangup (DLE EOT) message is received. 3780Plus normally drops the line (DTR) when it receives a Hangup message.

-I*irq* is an option generally used to specify the interrupt set on your internal MS-DOS communications card. Note: There is no space between the -I and the specified IRQ. Normally, the interrupt line is detected automatically, so this parameter is not used. If 3780Plus cannot find the interrupt line, it exits with an error message or is unable to transmit. In this case, supply the interrupt with the -I option. For example:

```
3780Plus  -I3
```

forces interrupt line (IRQ) 3. The communications card must be set at the interrupt specified. See the appropriate *MS-DOS Installation* section for allowable interrupt values. This option is valid only on MS-DOS versions.

-K [*token ...*] is an option to enable token, environment, and counter variable processing, and, if a list of tokens is supplied, to set token variable(s). Up to 19 tokens may be supplied. Tokens may also be enabled, disabled, set, and/or changed with the TOken command (see **3.27 TOken - Enable, Disable, Display, or Set Token Variables** in **Chapter 3 - 3780Plus Commands**) or with the EXecute command (see **3.11 EXecute - Execute Commands from a Job/Script File** in **Chapter 3 - 3780Plus Commands**). Environment and counter variable processing may also be enable or disabled with the TOken command (see **3.27 TOken - Enable, Disable, Display, or Set Token Variables** in **Chapter 3 - 3780Plus Commands**).

-M [*monitorfile*] is an option to start the serial line monitor to display the actual received/transmitted protocol characters to the screen or, if a file name is supplied, to save the protocol to the specified file. The monitor is helpful for determining communication errors. The serial line monitor may also be started or stopped with the Monitor command (see **3.17 Monitor - Open or Close a Serial Line Monitor** in **Chapter 3 - 3780Plus Commands**) See **B.6 Monitor File** in **Appendix B - File Formats** for the format of the monitor

-N is an option to suppress the Carriage Return (CR) character during printer space suppress. This option affects only files directed specifically to the printer.

-R is an option to override host printer device selection to force incoming printer files to be saved to the default REceive filename or SCreen. Printer control and escape sequences are translated through the ASCII/EBCDIC translation table, and files are not spooled to the printer.

-S is an option to disable 3780Plus screen message display. This is helpful when running in the background or through another program.

-T is an option to translate transparent files for printing. With the -T option, transparent EBCDIC files from the host are converted to ASCII for printing. This option affects only files received with the PRint command or directed specifically to the printer.

-U is an option to suppress the 3780Plus **Esc** (escape) abort key. This option affects only MS-DOS versions.

-W is an option to translate incoming space compress characters (0x1D) through the translation table instead of automatically uncompressing them.

1.2 Starting 3780Plus

If 3780Plus is executed with no command line options (or with the -D command line option if required), the 3780 default configuration is used, and the command menu on the following page is displayed.

If 3780Plus is executed with a -C *cfgfile* but no -J *jobfile* option, the cfgfile specified becomes the current default configuration, and the command menu is displayed.

If 3780Plus is executed with a -J *jobfile* option, 3780Plus proceeds directly to transmitting and receiving files in the job file (unattended) mode. If the job file does not exit 3780Plus, the command menu is displayed upon completion.

The 3780Plus menu allows you to change configuration parameters, create and execute job (script) files, execute operating system commands, dial, answer, and transmit and receive files interactively. The Command> prompt must be displayed to enter commands. While this prompt is displayed, 3780Plus is looking only for keyboard input; incoming data is ignored. After a command is executed, 3780Plus remains in line monitoring mode to receive any incoming data. The **DELETE** key must be used to display the Command> prompt before entering further 3780Plus commands. The **DELETE** key may be used during command execution to terminate the command function. Some versions of 3780Plus may support a key other than the **DELETE** key. See the introduction to **Chapter 3 - 3780Plus Commands** for details.

Upon execution, 3780Plus creates two default files: RCVFILE.000 and PRINT.000. These files are created on the default drive and may be accessed in certain receive modes (see **3.18 PRint - Receive File(s) and Spool to Printer** and **3.20 REceive - Receive File(s)** in **Chapter 3 - 3780Plus Commands**). If these files are not accessed during a communications session, they will be automatically removed when exiting 3780Plus.

1.3 The 3780Plus Command Menu

3780Plus, when executed without a -J *jobfile* option, displays the following command menu:

```
Cleo 3780Plus(R)        Release:xxxxx        (C)1983 - 2001 Cleo Communications
COMMAND                                                          ACTION
(DELETE).....Escape current mode for new command[1]
ANswer minutes .....Wait a number of minutes for a call
AUtodial [P] tel# [t# tel#] [t#] [r#] .....Autodial command sequence (h for help)[2]
BInary filename [filename*][-etx] .....Transmit a BINARY file
COnfig [filename] .....Display or change configuration
DAta .....Data mode; DTR to modem
EOt.....Transmit EOT - End of Transmission
EXecute filename.....Execute job/script file
HElp .....Help information - command summary
JOb.....Job/script file creation
KEy message [-benrx].....Transmit keyboard message
LOg [message].....Log message or display Log file
MOnitor [filename].....Monitor to screen or disk file (name)
PRint [filename [-nxt] [command]].....Receive printer output[3]
QUit [exit code] [-d] .....Exit 3780Plus program
REceive [filename] [-nxt] .....Receive data file
SCreen [-nxt].....Receive screen output
SYstem command.....Execute operating System command
TAble [ascii.ovr [ebcdic.ovr]] .....Display or change translation table(s)
TExt filename [filename*] [-benrx].....Transmit a TEXT file
VOice .....Voice mode; drop modem/line
*  Use only when receiver and transmitter running 3780Plus
Command>
```

Notes:

[1] Some versions may support a key other than the **DELETE** key to escape the current mode. Variations from the **DELETE** key are displayed here in the command menu and are noted in the appropriate *Installation* section.

[2] AUtodial is supported only with select modems. See **Appendix A - Modem Support** for details.

[3] MS-DOS systems do not support the PRINT [command] option.

All 3780Plus commands may be executed by entering the first two letters of the desired command. Commands may be entered in upper or lower case. See **Chapter 3 - 3780Plus Commands** for a detailed description of each command function.

1.4 Connecting to the Remote System

3780Plus normally does not affect the condition of the connection when started. You must use the AUtodial command to break the previous connection and dial automatically, the ANswer command to break the previous connection and wait for a connection, or the VOice command to break the connection followed by the DAta command to allow communications.

1.4.1 Automatic Dialing

If you are dialing the remote 2780/3780 device with a Cleo supported auto dial modem, use the following procedure to establish a connection:

- Make sure that all the physical connections are established. See appropriate *Installation* section.
- If you are using an external auto dial modem, make sure it is on and in the DATA position or IDLE state.
- Execute 3780Plus. If you execute a command or run a job file before autodialing, you should see an "Awaiting Telephone Connection" message.
- Find your modem type in **Appendix A - Modem Support**. If needed, use the COnfig command to change parameters. See **3.6 COnfig - Display or Change Configuration** in **Chapter 3 - 3780Plus Commands** for instructions on changing the configuration parameters.
- Use the AUtodial command to make your connection. See **3.3 AUtodial - Automatic Dial** in **Chapter 3 - 3780Plus Commands** for instructions on using the AUtodial command.
- When your modem completes the connection, you should see a "Telephone Connection Complete" message. You are now connected to your remote system and may continue with your file transfer.

1.4.2 DTR-Controlled Dialing

If you are dialing the remote 2780/3780 device with a modem that supports DTR dialing, use the following procedure to establish a connection:

- Set up your modem according to the instructions in your modem manual. Enter the remote modem's phone number into your modem. This is usually accomplished through a front panel control.
- Make sure that all the physical connections are established. See appropriate *Installation* section.
- Execute 3780Plus.
- See **A.3 External Non-Autodial Modems** in **Appendix A - Modem Support**. Use the COnfig command to change parameters. See **3.6 COnfig - Display or Change Configuration** in **Chapter 3 - 3780Plus Commands** for instructions on changing the configuration parameters.
- Use the ANswer command to raise DTR and wait for a connection. See **3.1 ANswer - Automatic Answer** in **Chapter 3 - 3780Plus Commands** for instructions on using the ANswer command.
- When your modem completes the connection, you should see a "Telephone Connection Complete" message. You are now connected to your remote system and may continue with your file transfer.

Note: DTR-controlled modems normally only allow you to dial one phone number and, therefore, only one host.

1.4.3 Manual Dialing

If you are dialing the remote 2780/3780 device with a modem that does not support auto dialing or DTR dialing, use the following procedure to establish a connection:

- Make sure that all the physical connections are established. See appropriate *Installation* section.
- Execute 3780Plus. If you execute a command or run a job file, you should see an "Awaiting Telephone Connection" message.
- See **A.3 External Non-Autodial Modems** in **Appendix A - Modem Support**. Use the COnfig command to change parameters. See **3.6 COnfig - Display or Change Configuration** in **Chapter 3 - 3780Plus Commands** for instructions on changing the configuration parameters.
- Use the ANswer command to raise DTR and wait for a connection. See **3.1 ANswer - Automatic Answer** in **Chapter 3 - 3780Plus Commands** for instructions on using the ANswer command.
- To dial through the modem front panel:

  See your modem's manual for instructions on establishing the connection.
- OR To dial with a phone handset:

  Check that the modem is turned on and in the TALK or ORIG position. Lift the phone handset and listen for the dial tone. Dial the phone number. Wait to hear the high-pitched answer tone, then switch the modem to the DATA position and hang up the phone.
- You should then see a "Telephone Connection Complete" message. You are now connected to your remote system and may continue with your file transfer.

1.4.4 Automatic Answer

If the remote 2780/3780 device is calling your computer, use the following procedure to answer the line automatically:

- Make sure that all the physical connections are established. See appropriate *Installation* section.
- If you are using an external modem, check that the modem is turned on and in the DATA position or IDLE state.
- Execute 3780Plus. If you execute a command or run a job file before autoanswering, you should see an "Awaiting Telephone Connection" message.
- If you are using an autodial modem, find your modem type in **Appendix A - Modem Support**. If you are not using an autodial modem, see **A.3 External Non-Autodial Modems** in **Appendix A - Modem Support**. If needed, use the COnfig command to change parameters. See **3.6 COnfig - Display or Change Configuration** in **Chapter 3 - 3780Plus Commands** for instructions on changing the configuration parameters.
- Use the ANswer command to initialize the modem and bring up DTR. See **3.1 ANswer - Automatic Answer** in **Chapter 3 - 3780Plus Commands** for instructions on using the ANswer command.
- Once the connection is established, you should see a "Telephone Connection Complete" message. You are now connected to your remote system and may continue with your file transfer.

Chapter 2.
Configuration

This chapter describes each of the configuration settings and their effect on the operation of 3780Plus. It also describes how to display, modify, and save configuration settings. The following topics are covered in this chapter:

- Displaying and/or changing configuration settings
- The configuration parameters
- Configuration files

For information on the configuration file format see **B.1 Configuration File** in **Appendix B - File Formats**.

2.1 Displaying and/or Changing Configuration Settings

The COnfig command, executed from within 3780Plus, displays the following screen to allow you to modify the current configuration:

```
                        CONFIGURATION: DEFAULT[1]
Protocol Type           =  3780
Line Type               =  Switched Line
Terminal Type           =  Primary
Terminal Identification =  NULL

Transmission Data Block Format          Modem Hardware Parameters

Record Size             =  80           RTS/CTS Delay[2]  =  150 ms
Blocking Factor         =  1            Equalizer[3]      =  OFF
Space Compression       =  ON           Modulation type:
New Line Suppression    =  OFF              V.26 bis or Bell 201C (2400BPS)
                                        Dialing Method[4]:  =  Synchronous
Protocol Line Parameters

Repeat Limit            =  4
Retransmission Limit    =  4
Wait Limit              =  10
Delay Limit             =  100
Bid Limit               =  15
Idle Limit              =  OFF
Receive Limit           =  15
Alter configuration (y/n) ?
```

Notes:
[1] The values shown are the preset 3780 default values. If a configuration file was specified or the default.cfg file existed, that file name and the values from that file would be displayed instead.
[2] The RTS/CTS Delay is available only on Cleo internal modems.
[3] The Equalizer is available only on select Cleo internal modems.
[4] The Dialing Method is available only on interface boards, RS-232 ports of internal modems, SYNCcables, or SYNCcable+'s.

Answering "N" to the "Alter configuration (y/n)?" prompt returns 3780Plus to interactive line monitoring; use the **DELETE** key to redisplay the Command> prompt.

Answering "Y" to the "Alter configuration (y/n)?" prompt, prompts you for changes on each of the parameters. Help is available to explain each of the configuration parameters. Each parameter is described in detail in the following section.

After a response to each of the configuration parameter prompts, you are prompted for a configuration file name:

Enter new configuration filename or <cr>:

Entering a valid filename causes the modified configuration to be written to the new configuration file. Entering the filename default.cfg allows this new configuration to become the 3780Plus default.

If no filename is entered, the changes are in memory only until the program is exited.

2.2 The Configuration Parameters

Table 2.1 below lists the configuration parameters with their default values and range limits. A detailed description of each of these parameters follows.

PARAMETER	DEFAULT	LOW	HIGH
Protocol Type	3780 (0)	3780 (0)	2780 (no blank fill) (5)
Line Type	Switched (0)	Switched (0)	Multipoint (2)
Terminal Type	Primary (1)	Primary (1)	Secondary (2)
Terminal Id			20 char
Record Size	80	1	2048
Blocking Factor	1	0	2048
Space Compression	ON (1)	OFF (0)	ON (1)
New Line Suppression	OFF (0)	OFF (0)	ON (1)
Repeat Limit	4	3	255
Retransmission Limit	4	4	255
Wait Limit	10	10 (-1)*	255
Delay Limit	100	10 (-1)*	255
Bid Limit	15	3 (-1)*	255
Idle Limit	No timeout (0)	No timeout (0)	270 seconds (9)
Receive Limit	15	3 (-1)*	255
RTS/CTS Delay	150ms (0)	150ms (0)	600ms (2)
Equalizer	OFF (0)	OFF (0)	ON (1)
Modulation Type	Bell 201 (1)	Other (0)	115,200 bps (17)
Dialing Method	Sync (0)	Sync (0)	V.25bis (4)

- A value of -1 allows an unlimited number of messages to be sent or received.

TABLE 2.1 CONFIGURATION PARAMETERS

Note: The stored configuration file is all numeric; the numbers in parentheses are the actual values saved in the configuration file.

Protocol Type

The Protocol Type configures 3780Plus as a 3780 (=0) or 2780 (=1) terminal. 3780Plus may also be configured for 2780 EM (=3) which suppresses 2780 blank fill characters and sends an End Message (EM) character at the end of each record, or 2780 No blank fill (=5) which suppresses 2780 blank fill characters. The default is 3780 (0).

Line Type

With internal modem versions of 3780Plus, the Line Type configures 3780Plus for a switched or dialup line (=0), leased or private point-to-point line (=1), or multipoint line (=2). Note: Not all modems support leased lines. If leased line is supported, switch and/or jumper changes must be made on the modem, and a different phone cable is required. See the appropriate *Installation* section for details.

With external modem versions of 3780Plus, the Line Type determines the modem signal to use for line connection status. With a switched line (=0) or multipoint line (=2), 3780Plus determines whether the line is up or down by the state of the DSR (data set ready) signal. With a leased line (=1) setting, 3780Plus determines whether the line is up or down by the state of the CD (carrier detect) signal. Generally, half duplex modems must be set for switched line, and full duplex modems (dialup or leased) must be set for leased line.

The default is switched line (0).

Terminal Type

The Terminal Type configures 3780Plus as a primary (=1) or a secondary (=2) terminal. A primary terminal will send line bid messages at one second intervals, while a secondary terminal will send line bid messages at three second intervals. By setting the terminal type to secondary, a **CONTEN** status is displayed when a line bid contention (i.e. both sides are trying to transmit at the same time) is encountered. The default is primary terminal (1).

Terminal Identification

The Terminal ID is optional ASCII string that is used to identify the terminal to the remote. It may be blank or 1 to 20 characters in length. The default is blank for no terminal id.

On switched lines, the Terminal ID is used as a security mechanism to prevent unauthorized terminals from gaining access to host computers. This parameter is generally 5 characters in length of the form *XXABC*, where:

XX	=	2 identical ASCII characters
ABC	=	3 ASCII characters

On multipoint lines, the Terminal ID defines the polling and selection addresses. It is 4 characters in length of the form *XXxx*, where:

XX	=	2 identical upper case letters
xx	=	lower case of previous 2 letters

See **C.1 Multipoint Operation** in **Appendix C - Multipoint Operation and Device Selection** for details.

Transmission Record Size

The Transmission Record Size is the transmitting record's maximum size. Since 2780 equipment has 80 column card reader input, this value is usually 80 characters. The minimum value is 1, the maximum value is 2048, and the default value is 80. In most cases host computers are limited to 512 character blocks. Note: 3780Plus will automatically receive blocks that contain up to 4048 characters.

For 2780 TExt (non-transparent) files, lines shorter than the Record Size are padded with spaces to the Record Size length before transmission. For 3780 TExt (non-transparent) files, record sizes will be equal to the number of characters per line (minus spaces if Space Compression is enabled). If the line length is longer than the Record Size or the files do not have imbedded CR/LFs (carriage return and linefeed characters) or NLs (new line characters), a record separator will be inserted at the set Record Size.

Transmission Blocking Factor

The Transmission Blocking Factor is the number of records to be transmitted. The Blocking Factor multiplied by the Record Size is equal to the maximum number of characters to be transmitted in each transmission block. The Blocking Factor is generally 1 for 3780 and 2 for 2780. The Blocking Factor for BInary (transparent) transmissions should always be 1. The Blocking Factor for TExt (non-transparent) transmissions must create a transmission block of less than 2048. Note: In most cases host computers are limited to 512 character blocks. 3780Plus will automatically receive blocks that contain up to 4048 characters.

Special cases: A Blocking Factor of 1 for 3780 TExt transmissions packs as many non Space Compressed records as possible into a block of "Record Size" length; a Blocking Factor of 0 for 3780 TExt transmissions packs as many Space Compressed (if Space Compression is ON) records as possible into a block of "Record Size" length.

Space Compression

Space Compression allows two or more consecutive spaces to be removed from transmitted TExt files and KEy messages. Space Compression may be ON (=1) or OFF (=0). The default is ON (1). Space Compression is valid only on 3780 non-transparent (text) transmissions. Space Compression is ignored for transparent (BInary) and 2780 transmissions. Note: Space compression sequences are always expanded when non-transparent (text) files are received.

New Line Suppression

New Line Suppression affects non-transparent (text) file reception only. New Line Suppression may be ON (=1) or OFF (=0). The default is OFF (0). With New Line Suppression OFF, any record separators received in non-transparent (text) files will be translated to carriage return and line feed characters (CR/LF) for MS-DOS or to new line (NL) characters for UNIX/XENIX/AIX. With New Line Suppression ON, any record separators received are ignored; this effectively removes all CR/LF or NL characters from the received file.

Repeat Limit

The Repeat Limit sets the maximum number of consecutive times that an enquiry (ENQ) message will be sent as a repeat message without an appropriate response. When the limit expires, transmission aborts. The minimum value is 3, the maximum value is 255, and the default value is 4.

The Repeat Limit is similar to the Bid Limit. The Repeat Limit, however, occurs only after the remote computer has responded to at least one initial line bid (ENQ).

When the Repeat Limit is reached, the status message **REPEAT** is displayed and the transmit command is aborted.

Retransmission Limit

The Retransmission Limit sets the maximum number of consecutive times that a negative acknowledge (NAK) may be sent or received before transmission is aborted. A negative acknowledge means the block was received in error. The minimum value is 4, the maximum value is 255, and the default value is 4.

When the Retransmission Limit is reached, the status message **RETRAN** is displayed and the transmit or receive command is aborted.

Wait Limit

The Wait Limit sets the maximum number of consecutive times that a wait message (WACK) will be received before transmission is aborted. A WACK means that the remote system received the last block correctly but needs more time to free up buffers, etc. Receiving a WACK causes 3780Plus to wait and re-bid (ENQ) the line. When the appropriate ACK is received, the transmission resumes. The minimum value is 10, the maximum value is 255, and the default value is 10. A value of -1 allows an unlimited number of wait messages to be received.

When the Wait Limit is reached, the status message **WAIT** is displayed and the transmit command is aborted.

Delay Limit

The Delay Limit sets the maximum number of consecutive times that a delay message (TTD) will be received before transmission is aborted. A TTD means the remote computer is busy and is holding the line open in order to queue up more data to send. The minimum value is 10, the maximum value is 255, and the default value is 100. A value of -1 allows an unlimited number of delay messages to be received.

When the Delay Limit is reached, the status message **DELAY** is displayed and the receive command is aborted.

Bid Limit

The Bid Limit sets the maximum number of consecutive times that an enquiry (ENQ) message will be sent as a line bid without receiving acknowledgment. The minimum value is 3, the maximum value is 255, and the default value is 15. A value of -1 allows an unlimited number of enquiries to be sent. This keeps 3780Plus continuously open to transmissions and is useful in leased or private line configurations.

When the Bid Limit is reached, the status message **BIDLMT** is displayed and the transmit command is aborted.

Idle Limit

The Idle Limit specifies how long, in seconds, 3780Plus will wait before disconnecting the communication line when no data is transmitted or received. Valid Idle Limits are: no idle timeout (=0), 30 seconds (=1), 60 seconds (=2), 90 seconds (=3), 120 seconds (=4), 150 seconds (=5), 180 seconds (=6), 210 seconds (=7), 240 seconds (=8), and 270 seconds (=9). The default is no idle timeout (0). The value specified with COnfig is rounded to the nearest 30 second interval.

In order for the Idle Limit to take effect, set the Idle Limit to a lower timeout value than the Receive Limit timeout and/or the Bid Limit and Repeat Limit timeouts.

When the Idle Limit is reached during transmission or reception, the status message **IDLE** is displayed and the transmit or receive command is aborted.

Receive Limit

The Receive Limit sets the maximum number of consecutive times a receive timeout may occur in receive mode before the transmission is aborted. A receive timeout occurs after 3780Plus has waited 4 seconds without receiving data from the remote terminal. This limit prevents 3780Plus from hanging when the remote terminal does not begin transmission or does not respond during a transmission. The minimum value is 3, the maximum value is 255, and the default is 15. A value of -1 allows an unlimited number of timeouts to occur.

When the Receive Limit is reached after a file has started, the status message **RECEIV** is displayed and the receive is aborted. Within a job file, when the Receive Limit is reached before a file is received, the status message **NODATA** is displayed and the receive command is aborted.

RTS/CTS Delay

The RTS/CTS Delay is available only on Cleo internal modems. The RTS/CTS delay sets the time delay between the modem's reception of the Request To Send signal and its response with a Clear To Send signal. This delay is normally set at 150ms (=0) for long distance transmissions, but may be set at 25ms (=1) for short distance transmissions or 600ms (=2) for satellite transmissions.

For external modems, check your modem manual for instructions on setting this parameter.

Equalizer

The Equalizer is available only on select Cleo internal modems. Signals may optionally be passed through an equalizer to compensate for line noise. The equalizer may be turned ON (=1) or OFF (=0). The default is OFF (0).

Modulation Type

The Modulation Type lets you select the type of modulation and the baud rate at which communications will occur. The correct selection of the modulation type is particularly important for external Hayes AT autodial modems and PC/SIB or SYNCcable+ with clocking. The modulation types are shown below. For internal modem versions of 3780Plus, only the supported modulation types are displayed with the COnfig command. The default is normally CCITT V.26bis or Bell 201C (1).

0	=	Other
1	=	CCITT V.26bis or Bell 201C (2400 BPS)
2	=	CCITT V.26bis fallback (1200 BPS)
3	=	CCITT V.22bis (2400 BPS)
4	=	CCITT V.22 (1200 BPS)
5	=	Bell 212 (1200 BPS)
6	=	Bell 208 (4800 BPS)
7	=	Bell 209 (9600 BPS)
8	=	CCITT V.29 (9600 BPS)
9	=	CCITT V.32 (9600/4800 BPS)
10	=	19,200 BPS
11	=	Bell 202S/V.23 (1200 BPS)
12	=	CCITT V.27ter (4800 BPS)
13	=	CCITT V.33 or V.17 (14400 BPS)
14	=	CCITT V.32bis (14400 BPS)
15	=	38,400 BPS
16	=	57,600 BPS
17	=	115,200 BPS
18	=	V.34 (28,800 BPS)
19	=	64,000 BPS
20	=	128,000 BPS

115,200 BPS (Modulation = 17) is supported for AT autodialing, but NOT for internal clocking.

V.34 (28,800 BPS), 64000 BPS, and 128000 BPS (Modulations 18-20) support AT autodialing at 19,200 BPS, but do not supported internal clocking.

To run most efficiently with SYNCcable+ at synchronous speeds greater than 4800 BPS, you should use the -B *baudrate* command line option when starting 3780Plus. The -B option sets the asynchronous baudrate. This asynchronous speed should be set equal to or greater than the synchronous speed. For example if the modulation is set to CCITT V.32bis (14400 BPS), you should use the -B 19200 command line option to start 3780Plus. See **1.1 The 3780Plus Command Line** in **Chapter 1 - Operation** for details.

Dialing Method

The Dialing Method allows you to select the method 3780Plus uses to configure, autodial, and autoanswer your external modem. This parameter is not available on CLEO internal modem versions of 3780Plus. Available Dialing Methods include: Synchronous (=0), AT Command (=1), None (=2), Don't Know (=3), or CCITT V.25bis (=4). The default is Synchronous (0).

The Synchronous dialing method automatically detects UDS BSC, SADL, or CCITT V.25bis modem types and dials appropriately. The CCITT V.25bis dialing method automatically dials CCITT V.25bis modem types without attempting to auto-detect the dial method. The AT Command dialing method autodials asynchronously with the Hayes AT compatible command set; the Modulation Type selects the baud rate of the AT dialing. For operation with leased line modems, non-autodial modems, modem eliminators, or null modems, the Dialing Method should be set to None.

2.3 Configuration Files

Configuration files may be used during subsequent 3780Plus executions by including the configuration filename as an argument when executing 3780Plus, or by executing the COnfig command with the filename as an argument:

3780Plus -C CFGFILE
or
Command> CONFIG CFGFILE

The configuration parameters are read directly from the previously created disk file CFGFILE.

2.3.1 Creating New Configuration Files

To create a new configuration file, execute the COnfig command and answer "Y" to the "Alter configuration (y/n)?" prompt. Change the desired configuration parameters. After responses to each of the configuration parameter prompts, you are prompted for a configuration file name:

Enter new configuration filename or <cr>:

Entering a valid filename causes the modified configuration to be written to the new configuration file. Entering the filename default.cfg allows this new configuration to become the 3780Plus default.

Configuration files may also be created and/or modified with a standard text editor. The order of the parameters in the configuration file is different than the order displayed in the COnfig menu. See **B.1 Configuration File** in **Appendix B - File Formats** for the configuration file layout. The stored configuration file is all numeric; see **2.2 The Configuration Parameters** for the corresponding parameter values.

2.3.2 Modifying Configuration Files

To modify a configuration file, execute the COnfig command with the current configuration filename. Then execute the COnfig command without a filename and answer "Y" to the "Alter configuration (y/n)?" prompt. Change the desired configuration parameters. Re-enter the same filename when you are prompted for a new configuration file name:

Enter new configuration filename or <cr>:

Chapter 3.
3780Plus Commands

This chapter describes each of the 3780Plus commands in detail. These commands may be executed interactively from the 3780Plus Command> prompt or may be executed automatically from within a job/script file.

The **DELETE** key is used in interactive mode to display the Command> prompt. Some versions of 3780Plus may support a key other than the **DELETE** key. For instance VMS, OpenVMS, Digital UNIX, HP/UX, OSF/1, AIX, SunOS, and Solaris use the **CTRL+C** key sequence. This Command> prompt indicates that 3780Plus is ready to accept a command.

In interactive mode, the Command> prompt must be displayed before entering a 3780Plus command.

The following commands, listed in alphabetical order, are covered in this chapter:

Making and Breaking the Connection:
- AUtodial - Automatic dial
- ANswer - Automatic answer
- AT - Send an 'AT' string to the modem
- VOice - Disconnect phone line & disable autoanswer
- DAta - Data mode

File Transfers:
- BInary - Transmit binary file(s)
- TExt - Transmit text file(s)
- KEy - Transmit a keyboard message
- EOt - Transmit an End of Transmission
- REceive - Receive file(s)
- SCreen - Receive file(s) and display on screen
- PRint - Receive file(s) and spool to printer
- INterrupt - Interrupt a receive file

Configuration:
- COnfig - Display or change configuration
- TAble - Display or change translation table(s)

Diagnostics:
- LOg - Open, close, display, or write to the log file
- MOnitor - Open or close a serial line monitor
- XX - Post current 3780Plus information
- HElp - Display 3780Plus command information

Automating Sessions with Job Scripts:
- JOb - Create or scramble a job/script file
- EXecute - Execute commands from a job/script file
- BRanch - Branch in job/script file based on condition
- ## - Job/script comment line

Tokens, Variables, and Counters:
- TOken - Enable, disable, display, or set token variables
- STart - Display or initialize counter
- +COUNTER - Increment counter
- -COUNTER - Decrement counter

Miscellaneous:
- SYstem - Execute an operating system command or an application program
- SLeep - Pause specified seconds
- QUit - Exit 3780Plus

All 3780Plus commands may be executed by entering the first two letters of the desired command.

The **DELETE** key (or the key used by your 3780Plus version) may be used during command execution to abort the current command. If a file is in the process of being transmitted, it will be aborted as soon as the current block is sent and acknowledged and post an **ABORT** status message. If a data file is in the process of being received, the **DELETE** key will cause 3780Plus to send an RVI (reverse interrupt); it will leave receive mode after the remote terminal stops transmitting and post an **INTEOF** (interrupt end-of-file) status message. During an AUtodial or ANswer command, the **DELETE** key will cause 3780Plus to abort the process and post a **DIAL_ABORT** status message

NOTE: For an immediate abort of the 3780Plus program, use your operating system's abort key (**CTRL+C** for MS-DOS; **CTRL+** for UNIX-based systems) or the **ESC** key under DOS. 3780Plus will hang up the phone line, post a **3780Plus Terminated** message to the screen and log file, and exit.

3.1 ANswer - Automatic Answer

The ANswer command allows you initialize the modem and wait a specified amount of time for an incoming phone call. ANswer may also be used with manual dial or DTR-controlled autodial modems to wait for the connection to be established. The ANswer command line format is:

ANswer *minutes*
or
ANswer *HH:MM*

where:

minutes is the number of minutes (1-999) to wait for an incoming phone call.

HH:MM is the hour and minutes in military time to wait for a call. For example: 1 p.m. is 13:00, 2:30 p.m. is 14:30, etc.

ANswer may be placed in front of transmit or receive commands to wait for a line connection. A timeout, in minutes, is specified so that if the connection is not established within the specified period, the ANswer command will timeout.

On external modems, the modem initialization type is selected with the COnfig Dial Method parameter. The speed at which the modem initialization string is sent is selected with the COnfig Modulation parameter. The signal 3780Plus uses to detect a connection is selected with the COnfig Line Type parameter. Locate your modem type in **Appendix A - Modem Support** for configuration parameter requirements.

Example:

```
ANSWER 6:00
```

waits until 6:00 AM for an incoming call.

Example:

```
ANSWER 60
```

waits one hour (60 minutes) for an incoming call.

An answer status will appear while waiting for the connection:

```
Time Remaining for Connect: 59:11
```

A result message is posted for the ANswer. You may branch on one of the following status messages: **OK** if the incoming call is answered; **FAIL** if there are no incoming calls within the timeout period; or **DIAL_ABORT** if ANswer is aborted with the **DELETE** key. See **B.3.1 The Autodial/Answer/AT Status Line** in **Appendix B. File Formats** for details.

If the ANswer timeout expires with the line inactive and no BRanch command follows, subsequent commands are skipped (except for COnfig and SYstem) until the next ANswer, AUtodial, or QUit command is reached.

ANswer is a legal job file command (see JOb).

3.2 AT - Send an 'AT' String to the Modem

The AT command allows you to send an AT command string to configure the attached Hayes AT command compatible modem. This string may consist of a single or multiple AT commands. The AT command line format is:

AT ATcommands

where:

AT — is the "attention" command for AT compatible modems. This should precede all AT commands.

commands — is the AT command or series of commands to send to the modem. A few special characters that may be used within the AT string: the tilde (~) causes a 1/2 second pause; the caret-M (^M) causes a carriage return to be sent to the modem. See your modem manual for more information on AT commands.

The AT command is only supported on AT command compatible modems.

The configuration Dial Method parameter must be set to AT Command. The speed at which the AT string is sent is selected with the configuration Modulation parameter. AT commands should only be sent when the modem is off-line.

Example:

```
AT ATX4
```

sends the ATX4 command to the attached modem to configure it to return result codes/messages from the extended result set 4. This allows the modem to return busy, no dial tone, and connection speed messages for automatic dialing and answering.

A modem result message is posted for the AT command. You may branch on this result message or one of the following status messages: **OK** if the command is accepted; **FAIL** if the command is rejected (the modem returned an ERROR result message); or **DIAL_ABORT** if the command aborted with the **DELETE** key. See **B.3.1 The Autodial/Answer/AT Status Line** in **Appendix B - File Formats** for details.

AT is a legal job file command (see JOb).

3.3 AUtodial - Automatic Dial

The AUtodial command provides automatic dialing to establish the modem line connection with a remote system. AUtodial permits a dialing sequence of up to four telephone numbers and/or access codes. AUtodial allows you to: tone or pulse dial, dial multiple numbers and/or access codes, specify the delay between dialing of multiple numbers, specify the wait for the remote answer, and the number of redial attempts if call is incomplete. The AUtodial command line format is:

AUtodial [P] *telephone#* [T*xx* *telephone#*...] [T*xx*] [R*xx*]

where:

P — is an option to pulse dial. The default is tone dial.

telephone# — is the telephone number or access code to be dialed. Up to four numbers may be dialed. Each additional number in a multi-number sequence must be preceded by the T*xx* option. All numbers must be entered in one of the following formats:

18005551212 or 1-800-555-1212

Spaces are not allowed within a number.

T*xx* — specifies a time delay in seconds. The T*xx* option must be included before each additional telephone number dialed in a multi-number sequence. Valid entries for *xx* are 1 to 99.

The final T*xx* is optional and specifies the time to wait for the remote answer back tone. If the final T*xx* option is not specified, the answer back tone detect period is 30 seconds.

R*xx* — specifies the number of redial attempts. Valid entries for *xx* are 1 to 31,000 or -1 for 31,000. After the final number is dialed, 3780Plus monitors the line for about 30 seconds to detect an answer back tone from the remote modem. If the answer back tone is detected, communications are enabled, otherwise the auto dial sequence will be repeated according to the number of attempts specified by the R*xx* option. When the R*xx* option is omitted, AUtodial defaults to three redial attempts.

On external modems, the modem initialization and dialing type are selected with the configuration Dial Method parameter. The speed at which the modem initialization and dial string are sent is selected with the configuration Modulation parameter. The signal 3780Plus uses to detect a connection is selected with the configuration Line Type parameter. Locate your modem type in **Appendix A - Modem Support** for configuration parameter requirements.

AUtodial is only supported on select modems such as Cleo internal modems, UDS/Motorola external modems, Racal-Vadic SADL type modems, Hayes compatibles with AT command set support, and various modems with CCITT V.25bis support. See **Appendix A - Modem Support** for details.

Example:

```
AUTODIAL P 1-800-555-1212 R10
```

Pulse dialing (P) is used to dial the phone number (1-800-555-1212) up to 10 times (R10).

Example:

```
AUTODIAL 9 T5 18005551212 T10 3978110 R4
```

Tone dialing is used. A PBX access code (9) is dialed, a 5 second pause occurs (T5); the telephone number (18005551212) is dialed, a 10 second pause occurs (T10); an access code (3978110) is dialed. This sequence may be repeated up to 4 times (R4) in attempt to complete the telephone connection. A message will be displayed indicating the connection status.

A dial result message is posted for the AUtodial. You may branch on this result message or one of the following status messages: **OK** if the call is completed; **FAIL** if the call is not completed within the specified number of retries; or **DIAL_ABORT** if AUtodial is aborted with the **DELETE** key. See **B.3.1 The Autodial/Answer/AT Status Line** in **Appendix B. File Formats** for details.

If the connection is not completed within the specified number of redial attempts and no BRanch command follows, commands following the incomplete AUtodial (except for COnfig and SYstem) are skipped until the next AUtodial, ANswer, or QUit command.

AUtodial is a legal job file command (see JOb).

3.4 BInary - Transmit Binary File(s)

The BInary command may be used to transmit any file to the remote system in transparent mode. These files are normally transmitted "as is" to avoid interference with protocol characters. Executable files and other non-ASCII files must be transmitted with the BInary command. The BInary command line format is:

BInary *filename* [*RemoteFilename*] [-E|-T|-X]

where:

filename is the file or files to be sent to the remote system. Wildcards and/or drives and paths may be used with file names. Note that if one of a group of transmitted files specified by a wildcard is terminated by anything other than a **NRMEOF** (normal end of file) status, the remaining specified files are not sent and the command is aborted.

RemoteFilename is an optional remote file name. This should be used only in a 3780Plus to 3780Plus connection. This filename is assigned to the file received by the remote processor. See **3.26.1 File Naming** for details.

-E allows you to send multiple files to the host without releasing the line. The normal mode is for all transmit commands to send an EOT after each file. The -E option suppresses the EOT allowing you to retain control of the line.

-T allows data to be translated from the ASCII character set to the EBCDIC character set before being transmitted. All data is translated through the asciiebc.ovr translation file.

-X allows you to concatenate several files to appear as one file to the host. The -X option suppresses the ETX (End of Text) at the end of the last block in the file and the EOT. The ETX character represents the file separator character to the host. You should not use the -X option on the last file you send to insure that it is properly terminated with an ETX.

Note: The EOt command does not send an ETX, so if you have just used the -X option and want to close the transaction with the EOt command, you will not have sent the ETX. This is considered bad form within the protocol and will cause unpredictable results at the receiving end.

Multiple options may be specified together. In this case only one dash (-) should precede all options.

Example:

```
BINARY  MYFILE.1  -TX
BINARY  MYFILE.2  -T
```

sends MYFILE.1 and MYFILE.2 as one file (-X). Both files are translated before transmission (-T).

Example:

```
BINARY  *.HLP
```

sends all files with the .HLP extension.

Example:

```
BINARY  /usr/MY.EXE  /usr/YOUR.EXE
```

sends the file /usr/MY.EXE with the file name /usr/YOUR.EXE. This would save the MY.EXE file on the remote 3780Plus system as YOUR.EXE in the /usr directory.

If the MOnitor option is not selected or the MOnitor option is selected with the write to disk option, a moving "T" is displayed on the screen during transmission. A "T" indicates the successful transmission of one block of data. The speed at which this character moves across the screen depends upon block size and data line speed.

After each file is transmitted, a status line is posted giving a completion status message for the transmission and the number of data blocks sent. See **B.3.2 The Transmit/Receive Status Line** in **Appendix B. File Formats**. If the transmission was successful, a **NRMEOF** (Normal End of File) status message will display. See **Table B.3 Transmit Completion Status Messages** in **Appendix B. File Formats** for a complete list and **B.3.3 Status Messages** for a complete description of each status message.

In a job/script file, you may branch any of the status messages listed in Table B.3. Note, if a wildcard is used to transmit multiple files, you may branch only on the status of the last file transmitted.

If the line is down when the BInary command is executed and no branch command follows, 3780Plus will wait until a connection is made before continuing.

BInary is a legal job file command (see JOb).

3.5 BRanch - Branch in Job/Script File Based on Condition

The BRanch command allows you to make decisions within a job file based on the status of the communications session. The format of the BRanch command is:

BRanch ON|NOT *status* TO *label*
or
BRanch ON|NOT *return_code* TO *label*
or
BRanch ON|NOT SIZE [<|=|>] *file_size* TO *label*
or
BRanch ON|NOT %COUNTER*c*|$COUNTER*c* <|=|> *number* TO *label*
or
BRanch ON TRUE TO *label*

where:

ON	branches on a true condition;
NOT	branches on a false condition;
status	is the latest status message from a 3780Plus command;
return_code	is the return code from the command executed by SYstem;
file_size	is the size of last received file as saved to disk;
c	is the COUNTER number (1, 2, or 3);
number	is the numeric value to be compared to the contents of COUNTER*c*;
label	is the numeric label of the command to jump to. Note: This is not a physical line number but a pre-appended number; valid values for *label* are 1 to 9999.

The BRanch command is available only from within 3780Plus job files. It is not available for use in the interactive mode and is not displayed on the HELP menu.

3.5.1 BRanch ON|NOT *status* TO *label*

BRanch allows you to jump to a label in the job file based on a true or false test against the status message. The status message represents the result of the latest 3780Plus command executed. See **B.3.3 Status Messages** in **Appendix B. File Formats** for command status return codes.

Example:

```
AUTODIAL 397-8110 R10
BRANCH ON FAIL TO 999
TEXT account.*
BRANCH ON NRMEOF TO 100
KEY * Error sending files *
100 RECEIVE newcust.fil
BRANCH ON NRMEOF TO 200
KEY * Error receiving file *
200 VOICE
999 AUTODIAL 397-8111 R10
:
```

In this example, 3780Plus attempts to call the phone number 397-8110. If this call fails to make a connection after 10 retries, the number 397-8111 would be dialed (BRANCH ON FAIL TO 999). If, on the other hand, the connection was completed, all files starting with account would be transmitted. If the files were transmitted correctly (BRANCH ON NRMEOF TO 100), a file would be received to newcust.fil, otherwise a key message would be sent informing the remote that the files were sent incorrectly. If newcust.fil was received incorrectly, a key message would be sent informing the remote that the file was not received properly. The line would then be disconnected and 3780Plus would attempt to call the phone number 397-8111 and continue.

3.5.2 BRanch ON|NOT *return_code* TO *label*

BRanch allows you to jump to a label in the job file based on the return code (exit code) from a program executed with the SYstem command. If a job file contains a SYstem command followed by a BRanch command, the program return code is displayed on the screen and posted to the log file. The program return code is then used by the BRanch command to test against the value in the *return_code* field.

Example:

```
ANSWER 720
RECEIVE SIGNON.NEW
SYSTEM CHEKFILE
BRANCH NOT 0 TO 200
TEXT NEWS
VOICE
QUIT
200 KEY *** YOUR SIGNON HAS BEEN REJECTED ***
VOICE
QUIT
```

After the file SIGNON.NEW is received, the SYstem command loads and executes the program CHEKFILE. CHEKFILE would check the contents of SIGNON.NEW and exit with a return code of 0 if it is accepted and 5 if it is rejected. If CHEKFILE exited with a return code of 5, 3780Plus would send a "signon rejected" message, hang up the line, and quit. Otherwise, it would send a NEWS file, hang up the line, and quit.

The return code is an integer value. It is specific to the operating system you are using. In DOS, the return code is the value returned by the WAIT call (0x4D). The low 8 bits are the exit code of the application program and the high 8 bits indicate the DOS termination value. (See your DOS Technical Manual for information on the Call 0x4D function).

On UNIX-based systems, the return code is the value returned by the wait() system call. (See wait() in your UNIX System Manual). The high 8 bits represent the exit code from your program and the low 8 bits indicate the error status of your program (00 if no errors). To check the code returned by your program, multiply your exit code by 256. To check for an exit code of 5 in the example above, use the command:

```
BRANCH ON 1280 TO 200
```

3.5.3 BRanch ON|NOT SIZE [<|=|>] *file_size* TO *label*

BRanch allows you to jump to a label in the job file based on the size of the latest received file. If the <, >, or = is omitted, a BRANCH ON will cause a branch if the received file is greater than or equal to size *file_size*; a BRANCH NOT will cause a branch if the received file is less than size *file_size*.

Example:

```
10 RECEIVE newfile
BRANCH ON SIZE 84 TO 10
TEXT signoff
```

In this example, 3780Plus would keep receiving files until it received a file with 83 or fewer characters. This would happen under DOS if only one 80 character record was received (80 chars + CR + LF + EOF). It would then send a file containing the signoff message.

3.5.4 BRanch ON|NOT %COUNTER*c*|$COUNTER*c* <|=|> *number* TO *label*

BRanch allows you to jump to a label in the job file based on the contents of the specified counter.

Example:

```
TOken ON
STart COUNTER1=0
10 RECEIVE newfile
+COUNTER1
BRANCH ON %COUNTER1 < 5 TO 10
TEXT signoff
```

In this example, 3780Plus would receive five (5) files, newfile.000 through newfile.004. It would then send a file containing the signoff message. Note: The TOken ON command was used to enable the counter variable (%COUNTER1); it may have also been enabled with the 3780Plus -K command line option or any form of the TOken command (except the TOken OFF command).

3.5.5 BRanch ON TRUE TO *label*

TRUE is a special status that allows you to branch unconditionally to a job file label.

Example:

```
BRANCH ON TRUE TO 123
```

will always branch to the line labeled 123 regardless of the latest status return code.

3.5.6 BRanch Command Tips

BRanch commands may be stacked within a job file for multiple branch conditions. Example:

```
ANSWER 15
BRANCH NOT OK TO 345
123 RECEIVE file.000
BRANCH ON LINDWN TO 345
BRANCH NOT NRMEOF TO 123
345 VOICE
QUIT
```

This job file will wait 15 minutes for an incoming call. If a call is answered within this time, the REceive command is executed; otherwise, the VOice and QUit commands are processed. The first BRanch after the REceive command tests for a **LINDWN** condition and branches to VOice and QUit if the line is down. Note: Not all modems detect a line down condition; do not use this sequence with a modem that does not have line down detection. The following BRanch statement checks for not **NRMEOF** and tries to REceive again if the file was received with some type of error. Note that specifying the file extension causes file.000 to be overwritten each time this command is executed.

If the REceive filename is specified without an extension, extension numbering would start at .000. If .000 already existed, 3780Plus would search for the first extension number that does not exist. This distinction is useful for a command sequence such as:

```
478 RECEIVE goodfile
BRANCH ON NRMEOF TO 478
```

which would accumulate received files until some type of error occurred.

Careful construction of your job file is necessary when using the log option of 3780Plus. A loop such as:

```
44 RECEIVE file.dat
BRANCH NOT NRMEOF TO 44
```

may cause problems for the log file. If the line were to drop, a **LINDWN**, **HANGUP**, **IDLE**, **NODATA**, or **RECEIV** status would be returned, and the branch would be taken. Since a line down condition is likely to persist for some time and the REceive and BRanch commands are recorded continuously in 3780.LOG, disk space is rapidly used up. For a modem with line down detection, a better scheme is:

```
22 ANSWER 15
44 RECEIVE file.dat
BRANCH ON LINDWN TO 22
BRANCH ON HANGUP TO 22
BRANCH NOT NRMEOF TO 44
```

In the above sequence, the REceive executes only when the line is known to be active. For a modem without line down detection, a better scheme would be:

```
22 ANSWER 15
44 RECEIVE file.dat
BRANCH ON HANGUP TO 22
BRANCH ON IDLE TO 22
BRANCH ON NODATA TO 22
BRANCH ON RECEIV TO 22
BRANCH NOT NRMEOF TO 44
```

BRanch is a legal job file command (see JOb), but is not available for use in the interactive mode and is not displayed on the HELP menu.

3.6 COnfig - Display or Change Configuration

The COnfig command provides an easy method of viewing or changing the default 3780 configuration. The COnfig command line format is:

COnfig [*filename*]

where:

filename is a custom configuration file previously created with the COnfig command.

COnfig, executed without a filename, displays the following screen to allow modification of the current configuration:

```
                        CONFIGURATION: DEFAULT[1]
Protocol Type           =  3780
Line Type               =  Switched Line
Terminal Type           =  Primary
Terminal Identification =  NULL

Transmission Data Block Format          Modem Hardware Parameters

Record Size             =  80           RTS/CTS Delay[2]  =  150 ms
Blocking Factor         =  1            Equalizer[3]      =  OFF
Space Compression       =  ON           Modulation type:
New Line Suppression    =  OFF              V.26 bis or Bell 201C (2400BPS)
                                        Dialing Method[4]:  =  Synchronous
Protocol Line Parameters

Repeat Limit            =  4
Retransmission Limit    =  4
Wait Limit              =  10
Delay Limit             =  100
Bid Limit               =  15
Idle Limit              =  OFF
Receive Limit           =  15
Alter configuration (y/n) ?
```

Notes:

[1] The values shown are the preset 3780 default values. If a configuration file was specified or the default.cfg file existed, that file name and the values from that file would be displayed instead.

[2] The RTS/CTS Delay is available only on Cleo internal modems.

[3] The Equalizer is available only on select Cleo internal modems.

[4] The Dialing Method is available only on interface boards, RS-232 ports of internal modems, SYNCcables, or SYNCcable+'s.

Answering N to the Alter configuration (y/n)? prompt returns 3780Plus to interactive line monitoring mode; use the **DELETE** key to redisplay the Command> prompt. If you answer Y to the Alter configuration (y/n)? prompt, you will be prompted for changes on each of the parameters. Help menus are available or see **2.2 The Configuration Parameters** in **Chapter 2 - Configuration** for a detailed description of each parameter.

After a response to each of the configuration parameter prompts, you may save the modified configuration:

Enter new configuration filename or <cr>:

Entering a valid filename causes the modified configuration to be written to the new configuration file. Entering the filename default.cfg allows this new configuration to become the 3780Plus default.

If no filename is entered, the changes are in memory only until another configuration command affects them or the program is exited.

COnfig, executed with a filename, loads the configuration parameters from the specified file.

Example:

```
CONFIG  CHICAGO.CFG
```

would read the configuration parameters from the file CHICAGO.CFG.

Configuration files may also be created and/or modified with a standard text editor. See **B.1 Configuration File** in **Appendix B - File Formats** for the configuration file layout. The stored configuration file is all numeric; see **2.2 The Configuration Parameters** in **Chapter 2 - Configuration** for the corresponding parameter values.

These configuration files may be used during subsequent 3780Plus executions by including the configuration filename as an argument when executing 3780Plus, or by executing the COnfig command with the filename as an argument:

```
3780Plus -C CFGFILE
```

or

```
Command> CONFIG CFGFILE
```

The configuration parameters are read directly from the previously created disk file CFGFILE.

After a CONFIG *CFGFILE* command, a status line is not posted but you may branch on one of the following status messages: **OK** if the configuration file loaded successfully, **FAIL** if there is an error in the configuration file, or **NOFILE** if the specified configuration file does not exist. See Table B.4 and described in **B.3.3 Status Messages** in **Appendix B. File Formats** for details.

COnfig *filename* is a legal job file command, but COnfig by itself is not allowed in a job file (see JOb).

3.7 +COUNTER - Increment Counter

The +COUNTER command increments one of three counters. Counters may be used to count the repetitions of a function. The format of the +COUNTER command is:

+COUNTER*c*

where:

c is the number of the counter (1 through 3).

Example:

```
START  COUNTER1=1
10  RECEIVE  newfile%COUNTER1.
+COUNTER1
BRANCH  NOT  %COUNTER1  =  11  TO  10
KEY  DONE
```

3780Plus would receive 10 files: newfile1 through newfile10. It would then send a DONE message.

See also **3.23 STart - Display or Start Counter**, **3.8 -COUNTER - Decrement Counter**, and **3.5.4 BRanch ON|NOT %COUNTER*c*|$COUNTER*c* <|=|> *number* TO *label***.

This command may not be shortened to two characters in length. The full command must be specified.

+COUNTER is a legal job file command (see JOb).

3.8 -COUNTER - Decrement Counter

The -COUNTER command decrements one of three counters. The format of the -COUNTER command is:

-COUNTER*c*

where:

c is the number of the counter (1 through 3).

Example:

```
START  COUNTER2=10
10  TEXT  file%COUNTER2.new
-COUNTER2
BRANCH  ON  %COUNTER2  >  5  TO  10
KEY  DONE
```

3780Plus would send five files: file10.new, file9.new, file8.new, file7.new, and file6.new. It would then send a DONE message.

See also **3.23 STart - Display or Start Counter**, **3.7 +COUNTER - Increment Counter**, and **3.5.4 BRanch ON|NOT %COUNTER*c*|$COUNTER*c* <|=|> *number* TO *label***.

This command may not be shortened to two characters in length. The full command must be specified.

-COUNTER is a legal job file command (see JOb).

3.9 DAta - Data Mode

The DAta command causes the local modem to be enabled and the handset to be excluded, so that data transfer may occur. On an external modem, the Data Terminal Ready (DTR) signal is raised. No protocol is sent on the line in response to this command. The DAta command has no options; the DAta command line format is:

DAta

DAta is a legal job file command (see JOb).

3.10 EOt - Transmit an End Of Transmission

The EOt command transmits an EOT (ET) protocol character. An EOT signifies the end of the current transmission. TExt, BInary, and KEy commands automatically send EOT at their conclusion unless the -E or -X option is included at the end of the command line. The EOt command has no options; the EOt command line format is:

EOt

When the -E or -X option is used with the TExt, BInary, or KEy commands, an EOT must follow. If multiple files are to be transmitted without intervening EOTs or ETXs (as in the case above), the interval between file transfers should not be longer than about 10 seconds or line time outs may occur. For more information on the -X and -E options, see the TExt command.

Example:

```
KEY HELLO HOST -E
TEXT *.TXT -E
EOT
```

sends the message HELLO HOST without a trailing EOT, sends all file(s) with a .TXT file extension without intervening EOTs, then sends the EOT to signal the end of transmission.

After the EOT is transmitted, 3780Plus posts the following transmission status line message:

T: EOT (End of Transmission)

EOt is a legal job file command (see JOb).

3.11 EXecute - Execute Commands from a Job/Script File

The EXecute command causes 3780Plus to sequentially process the commands in the specified job file. The EXecute command line format is:

EXecute *JobFilename* [*token* [*token*]...]

where:

JobFilename is a custom job (or script) file previously created with the JOb command (see JOb) or a standard text editor.

token is an optional token for job file parameter substitution. Up to 19 tokens may be supplied. Tokens may also be set from the 3780Plus command line (see **1.1 The 3780Plus Command Line** in **Chapter 1 - Operation**) or set/changed with the TOken command (see **3.27 TOken - Enable, Disable, Display, or Set Token Variables**).

If the job file does not end with the QUit command, the message "Job file execution complete" should appear on the screen when the job file has finished. Upon completion of the job file, the program returns to monitoring the line for further incoming data. Many commands executed from within a job file remain in force after job file completion. For instance, if you had enabled the screen in a job file, all received files would go to the screen until reset by selecting the printer or the disk.

The EXecute command may be included in a job file. This causes a new job file to be loaded and executed. Note: 3780Plus does not return to the original job file upon completion of a nested job file.

The BRanch command provides an alternative to nested job files. Instead of executing other job files from within a job file, one large job file may be created and the BRanch command used to move within that job file to achieve the same effect. See **3.5 BRanch - Branch in Job/Script File Based on Condition** for details.

Example:

```
RECEIVE  FILE1.NEW
BRANCH  ON  NRMEOF  TO  100
EXECUTE  ERROR.JOB
100  RECEIVE  FILE2.NEW
```

may be used to execute a job file to handle receive errors.

The EXecute command is a legal job file command (see JOb).

3.12 HElp - Display 3780Plus Command Information

The HElp command displays the initial menu (see **1.4 The 3780Plus Command Menu** in **Chapter 1 - Operation**) which summarizes available interactive commands. The HElp command has no options; the HElp command line format is:

HElp

The HElp command does not change the current status.

The HElp command may not be included in a job file (see JOb).

3.13 INterrupt - Interrupt a Receive File

The INterrupt command is very similar to the REceive command, except that a filename is not specified, and, in general, only a partial file is received. This partial file is directed to the previously selected (or default) disk file, printer file, or screen. The INterrupt command has no options; the INterrupt command line format is:

INterrupt

The INterrupt command causes an RVI (reverse interrupt) to be transmitted in place of the positive acknowledgment upon reception of one data block from the remote processor. This should cause the remote transmitter to send an EOT which clears the line and allows you to transmit, if desired.

When executing INterrupt from a job file, receiving the EOT response to the transmitted RVI causes 3780Plus to advance to the next command in the job file.

If the MOnitor option is not selected or the MOnitor option is selected with the write to disk option, an "R" is displayed on the screen indicating 3780Plus has received one block of data.

After the file is received, a status line is posted giving a completion status for the received file including the number of data blocks received. See **B.3.2 The Transmit/Receive Status Line** in **Appendix B. File Formats**. You may branch on one of the following status messages: **INTEOF** if the receive file is successfully aborted, **NRMEOF** if the received file is only one block long, or any of the status messages listed in Table B.2 and described in **B.3.3 Status Messages** in **Appendix B. File Formats** for details.

INterrupt is a legal job file command (see JOb).

3.14 JOb - Create or Scramble Job/Script File

The JOb command allows you to create a job or script file from within 3780Plus. A job file is a disk file consisting of one or more 3780Plus commands to be run automatically. A job file is similar to an operating system script or batch file. JOb also allows you to scramble new or existing job files so that users cannot read them. This is provided as a security option to protect phone numbers, passwords, etc.

The JOb command line format is:

JOb
or
JOb [*old_job_file scrambled_file*]

where:

old_job_file is the existing job file to be scrambled. Note, this file is not deleted when the scrambled job file is created. It is a good idea to save this file (unscrambled) somewhere apart from the 3780Plus files; the scrambled file cannot be unscrambled.

scrambled_file is the scrambled job file to be created.

Entering JOb without filenames allows you to create a new job file. Enter a job file name in response to the Enter new job file name: prompt. To scramble the new job file, enter Y at the Encode this file? (y/n): prompt. The following message appears:

Valid job commands:
ANSWER minutes
API [#] [buffersize]
AUTODIAL [p] *tel#* [t*xx* *tel#...*][t*xx*] [r*xx*]
BINARY *name* [*name*] [-etx]
BRANCH on/not CONDITION to LABEL
BRANCH on/not %COUNTER#|$COUNTER# >/=/< *xx* to LABEL
CONFIG *name*
DATA
EOT
EXECUTE *name*
INTERRUPT
KEY *message* [-benrx]
LOG *message*
MONITOR [*name*]
PRINT [*name* [-nxt] [*command*]]
QUIT [*exit code*] [-d]
+/- COUNTER#
RECEIVE [*name*] [-nxt]
START [COUNTER# [=*xx*]]
SCREEN [-nxt]
SLEEP *seconds*
SYSTEM *command*
TABLE *name* [*name*]
TEXT *name* [*name*] [-benrx]
TOKEN [*string* [*string*]]
VOICE
[*comment*]

Enter command [argument] or <cr>:

Enter the commands to be executed. Each command must be entered on a new line. To end the job file, press the **ENTER** key twice. The following message appears:

Job file written to disk: *filename*

During scrambled job file execution, you may want to use the -S command line option to stop the screen display and/or use the LOg file toggle to stop writing to the log file during sensitive transactions.

Example:

```
JOB  BBS.JOB  SCRAMBLE.JOB
SYSTEM  DEL  BBS.JOB
```

scrambles the existing BBS.JOB job/script file and saves it to the SCRAMBLE.JOB file, then deletes the original BBS.JOB file.

Job files may also be created and/or modified with a standard text editor. See **B.2 Job/Script File** in **Appendix B - File Formats** for the job file layout.

These job files may be executed either by including the job file name as an argument when 3780Plus is executed, or by using the EXecute (execute job file) command.

```
3780Plus  -J  JOBFILE
```
or
```
Command> EXECUTE  JOBFILE
```

Commands are read from the previously created disk file JOBFILE.

See **Chapter 4 - 3780Plus Tutorial** for job file examples.

3.15 KEy - Transmit a Keyboard Message

The KEy command is used to send a keyboard message to the remote system. This message is normally translated from the ASCII character set to the EBCDIC character set then sent in non-transparent mode. The KEy command line format is:

KEy *message* [-B|-E|-N|-R|-X]

where:

message is the message to be sent to the remote system. The message must not be longer than the configured record size or the maximum keyboard line size of 150 characters, whichever is shorter.

-B allows data to be translated from the ASCII character set to the EBCDIC character set before being transmitted in transparent (binary) mode. Without this option, files are transmitted in non-transparent (text) mode.

-E allows you to send multiple files to the host without releasing the line. The normal mode is for all transmit commands to send an EOT after each file. The -E option suppresses the EOT, allowing you to retain control of the line.

-N allows non-transparent (text) data to be passed through as-is. Without this option, files are translated from the ASCII character set to the EBCDIC character set before transmission. Use this option with caution. Normal ASCII characters (i.e. 2 and 7) interfere with protocol characters preventing transmission.

-R allows record separators (IRS) to be omitted on transmitted files. This option essentially removes carriage return, line feed, and new line characters, and packs the data into one record. Without this option, carriage return/linefeeds (DOS) and new lines (UNIX/XENIX/AIX) are translated into record separators (IRS). In general, most host computers require record separators in non-transparent (text) files. This option is valid only in 3780 mode.

-X allows you to concatenate several messages and/or files to appear as one file to the host. The -X option suppresses the ETX (End of Text) at the end of the last block in the file and the EOT. The ETX character represents the file separator character to the host. You should not use the -X option on the last file you send to insure that it is properly terminated with an ETX.

Note: The EOt command does not send an ETX, so if you have just used the -X option and want to close the transaction with the EOt command, you will not have sent the ETX. This is considered bad form within the protocol and will cause unpredictable results at the receiving end.

Multiple options may be specified together. In this case only one dash (-) should precede all options.

Example:

```
KEY  SIGNON CLEO  -RE
KEY  SEND PRINTER FILES  -R
```

If the MOnitor option is not selected or the MOnitor option is selected with the write to disk option, a "T" is displayed on the screen. A "T" indicates 3780Plus has transmitted one block of data.

After each message is transmitted, a status line is posted giving a completion status message for the transmission and the number of data blocks sent. See **B.3.2 The Transmit/Receive Status Line** in **Appendix B. File Formats**. If the transmission was successful, a **NRMEOF** (Normal End of File) status message will display. See **Table B.3 Transmit Completion Status Messages** in **Appendix B. File Formats** for a complete list and **B.3.3 Status Messages** for a complete description of each status message.

In a job/script file, you may branch on any of the status messages listed in Table B.3.

If the line is down when the KEy command is executed and no branch command follows, 3780Plus will wait until a connection is made before continuing.

KEy is a legal job file command (see JOb).

3.16 LOg - Open, Close, Display, or Write to Log File

The LOg command allows the user to display the log file, write a message to the log file, or turn the logging on or off. A log file allows you to track all your communications transactions. Log files contain the date and time, the commands executed, and the status of each command. This may be used to review communications sessions or as a powerful diagnostic tool for tracing problems. Toggling the log file on and off allows parts of job files (for example, password transmissions) to be protected while other parts are logged. The LOg command line format is:

LOg [*filename*.LOG] [-O|-A]
or
LOg *message*

where:

filename is the log file to be created or appended. This log file name must have a .LOG extension, i.e. CHICAGO.LOG. If no filename is specified, the last specified log file name is used. The default filename is 3780.LOG.

-O is an option to overwrite an existing log file with the same name. This is the default.

-A is an option to append to an existing log file.

message is an message to be written to the log file. This message may be used, for example, to describe actions in the job file. The message must not be longer than 150 characters.

In interactive mode if the LOg command is entered alone, 3780Plus attempts to read the log file and display 23 lines at a time until completion. To abort the log display, press the **SPACE** key followed by the **ENTER** key.

In job file mode if the LOg command is entered alone, 3780Plus toggles the state of the logging option from off to append or from on to off. If the LOg command is entered with -A option, 3780Plus toggles the state of the logging option from off to append to an existing log file. If the LOg command is entered with the -O option, 3780Plus toggles the state of the logging option from off to overwrite an existing log file.

Example:

```
LOG  CHICAGO.LOG  -A
```

appends to the existing CHICAGO.LOG file.

Example:

```
LOG  ***COMMUNICATIONS WAS SUCCESSFULL***
```

writes the ***COMMUNICATIONS WAS SUCCESSFULL*** message to the current log file.

See **1.1 The 3780Plus Command Line** in **Chapter 1 - Operation** for instructions on initializing the log file on start up. The default log file name, 3780.LOG, may be changed. See **B.5 Video Display File** in **Appendix B - File Formats** for details

LOg is a legal job file command (see JOb).

3.17 MOnitor - Open or Close a Serial Line Monitor

The MOnitor command invokes a built-in serial line monitor to display the actual received/transmitted bisynchronous protocol on the screen or to save the protocol to a specified file. The monitor is helpful for determining communication errors. It should only be invoked, however, to determine the cause of a problem because it slows communications and/or consumes a lot of disk space. The MOnitor command line format is:

MOnitor [*filename*] [-O|-A|-S|-C]

where:

filename is the monitor file to be created or appended. This file will contain the protocol characters. Note: If a file with the specified name already exists, it will be overwritten. The filename specified should not be a printer or other slow device.

-O is an option to overwrite an existing monitor file with the same name. This is the default.

-A is an option to append to an existing monitor file.

-S is an option to display the monitor data to the screen in addition to saving it to a file.

-C is an option to display the standard ASCII characters (0x20 through 0x7F) in character format (i.e., 0x41 will display as the character "A"). The remaining characters (0x00 through 0x1F and 0x80 through 0xff) will display in hexadecimal format. Without this option, all characters will display in hexadecimal.

If the monitor is off, entering MOnitor without a filename directs the protocol characters to the screen. On some implementations, the screen presentation of the protocol is slow and communications may be slowed as a result.

When the monitor is on, entering the MOnitor command without a filename turns off the monitor to screen or to disk.

Entering MOnitor with a filename saves the protocol characters to the specified filename. Redirecting protocol information to a disk file consumes a lot of disk space. It is not unusual for the protocol saved to be four times as large as the actual data received or transmitted. Receiving a 100K file may actually use 500K of disk space.

Multiple options may be specified together. In this case only one dash (-) should precede all options.

Example:

```
MONITOR CHICAGO.MON -AC
```

appends to the existing CHICAGO. MON file with monitor data being saved in character, or ASCII, format.

If you encounter a 3780Plus error status message, check **B.3.3 Status Messages** in **Appendix B - File Formats** for possible actions before using the monitor. If you are getting a **NRMEOF** status but are receiving or transmitting data that you think should be different, use the monitor command to determine exactly what is being sent and received. For transmit problems, for instance, use the MOnitor command before the transmit command to save the monitor to a file and once again after the transmit command to turn the monitor off.

Example:

```
MONITOR  SIGNON.MON
TEXT  SIGNON
MONITOR
```

This will create a monitor file with the name SIGNON.MON. This monitor file may be displayed to the screen with the DOS command "TYPE SIGNON.MON" or UNIX command "cat SIGNON.MON", or it may be viewed with a text editor or printed. See **B.6 Monitor File** in **Appendix B - File Formats** for examples and a table of protocol characters. If necessary, a printout of your monitor file may be mailed or faxed to Cleo's Technical Support department.

The monitor may also be invoked with the 3780Plus -M *[filename*] command line option. See **1.1 The 3780Plus Command Line** in **Chapter 1 - Operation** for details.

MOnitor is a legal job file command (see JOb).

3.18 PRint - Receive File(s) and Spool to Printer

The PRint command places 3780Plus in receive mode and waits to receive one or more files from the remote terminal. This command is equivalent to the REceive command, except that printer tab and escape sequences are translated by 3780Plus to the appropriate action and files may be automatically spooled to the printer. Received non-transparent files are normally translated from the EBCDIC character set to the ASCII character set; received transparent files are normally left "as-is". The PRint command line format is:

PRint [*filename* [-N|-T|-R|-S|-X] [*command*]]

where:

filename is an optional receive file name. If no filename has been specified since 3780Plus logon, all received print files are accumulated serially as PRINT.000, PRINT.001, etc. Note: The default file name PRINT may be changed (see **B.5 Video Display File** in **Appendix B - File Formats**).

If a filename is specified without a file extension, files are saved with a numeric file extension starting with .000 *without overwriting* current files that have the same name.

Example:

PRint prtstuff

will save data to the file prtstuff.000 unless prtstuff.000 already exists. If prtstuff.000 exists, prtstuff.001 is tried, and so on, until a non-existent filename is found.

If a filename is specified with a numeric extension, files are accumulated serially starting at that number. Existing files with the same name are *overwritten*.

Example:

PRINT prtstuff.011

will save data to prtstuff.011 regardless of whether a file already exists with that name. The next files received will be saved as prtstuff.012, prtstuff.013, etc.

If a filename is specified with a non-numeric extension, after the first file is received, additional files are accumulated serially starting with a .000 extension. Existing files with the same name are *overwritten*.

Example:

PRINT prtstuff.new

will save data to prtstuff.new regardless of whether a file already exists with that name. The next files received will be saved as prtstuff.000, prtstuff.001, etc.

Files may be saved without file extensions by following the filename with a period (.).

Example:

PRINT NewFile.

will save data to NewFile without an extension. Consecutive files are saved as NewFile.000, NewFile.001, etc.

-N allows non-transparent (text) data to be passed through as-is. Without this option, files are translated from the EBCDIC character set to the ASCII character set upon reception. This option is valid only until an EOT is received from the remote system.

-T allows transparent (binary) data to be translated from the EBCDIC character set to the ASCII character set upon reception. Without this option, files are passed through as-is. This option is valid only until an EOT is received from the remote system. This option is similar to the 3780Plus -T command line option with the following exception: PRint -T converts protocol characters (i.e. IRS, IUS, IGS, DC1, DC2, and DC3) to their appropriate functions; 3780Plus -T translates these characters through the EBCDIC to ASCII translation tables.

If your print file is not readable and your print status line begins with PB:, your host may be sending a transparent EBCDIC file. Try receiving the file with the PRint -T option.

-R is an option to add carriage return/line feed (CR/LF) characters to the end of every received block.

-S is an option to display the received file to the screen in addition to saving it to a file.

-X is an option to concatenate several incoming files to appear as one file. The -X option ignores incoming ETX characters. The ETX character normally represents a file separator. An incoming EOT character will terminate the file.

command is an option to specify a print spooler command. This command is sent to the operating system to initialize printing. See **3.18.1 UNIX/VMS PRint Command** for more details. This option is not valid under MS-DOS. See **3.18.2 MS-DOS PRint Command** for alternate printing options.

The command option is not supported on MS-DOS systems.

Multiple options may be specified together. In this case only one dash (-) should precede all options.

Example:

```
PRINT  PRTFILE  -XN  lpr -r
```

saves the incoming file to the filename PRTFILE using both the -X option (to concatenate incoming files) and the -N option (to receive data as-is). It then spools it to the printer using the UNIX "lpr -r PRTFILE" command which removes the file after printing

3780Plus translates received escape sequences to the actions listed in Table 3.1. The specified action is postponed until a new line (NL) or record separator (RS) character is received. 3780Plus translates received vertical tab and form feed characters to the actions listed in Table 3.1. The specified action is performed immediately.

ESCAPE SEQUENCE			CARRIAGE OPERATION	
CHAR	HEX	ACTION	CHAR	HEX
ESC /	27 61	Single space	CR/LF	0D 0A
ESC S	27 E2	Double space	CR/LF/CR/LF	0D 0A 0D 0A
ESC T	27 E3	Triple space	CR/LF/CR/LF/CR/LF	0D 0A 0D 0A 0D 0A
ESC M	27 D4	Space suppress	CR[1]	0D[1]
ESC A	27 C1	Skip to channel 1	FF[2]	0C[2]
ESC B	27 C2	Skip to channel 2	[2]	[2]
ESC C	27 C3	Skip to channel 3	[2]	[2]
ESC D	27 C4	Skip to channel 4	[2]	[2]
ESC E	27 C5	Skip to channel 5	[2]	[2]
ESC F	27 C6	Skip to channel 6	[2]	[2]
ESC G	27 C7	Skip to channel 7	[2]	[2]
ESC H	27 C8	Skip to channel 8	[2]	[2]
ESC I	27 C9	Skip to channel 9	[2]	[2]
ESC J	27 D1	Skip to channel 10	[2]	[2]
ESC K	27 D2	Skip to channel 11	[2]	[2]
ESC L	27 D3	Skip to channel 12	[2]	[2]
FF	0C	Skip to channel 1	FF[2]	0C[2]
VT	0B	Skip to channel 2	[2]	[2]

[1] The 3780Plus command line option **-N** may be used to suppress this CR character.
[2] The actual carriage operation depends on settings in the channel.ovr file. See **B.7 Vertical Forms File** in **Appendix B - File Formats** for details.

TABLE 3.1 PRINTER ESCAPE SEQUENCE TRANSLATIONS

If the MOnitor option is not selected or it is selected with the write to disk option, a moving "R" is displayed on the screen. An "R" indicates 3780Plus has received one block of data. The speed at which this character moves across the screen depends upon block size and data line speed.

After each file is received, a status line is posted giving a completion status message for the receive and the number of data blocks received. See **B.3.2 The Transmit/Receive Status Line** in **Appendix B. File Formats**. If the receive was successful, a **NRMEOF** (Normal End of File) status message will display. See **Table B.2 Receive Completion Status Messages** in **Appendix B. File Formats** for a complete list and **B.3.3 Status Messages** for a complete description of each status message.

In interactive mode, 3780Plus continues to receive files and write them to disk until (1) another receive mode is entered with a PRint, SCreen, or another REceive *filename* command or (2) the receive mode is exited with the **DELETE** key. In a job/script file, 3780Plus receives file(s) only until it (1) receives an end of transmission (EOT), or (2) the receive mode is exited with the **DELETE** key, or (3) the receive timeout has expired, or (4) an error has occurred. Note that if one of a group of receive files is terminated abnormally, the remaining files are not received.

In a job/script file, you may branch on any of the status messages listed in Table B.2.

If files with printer device selection codes (see **C.2 Device Selection** in **Appendix C - Multipoint Operation and Device Selection**) are received while 3780Plus is not in the print receive mode, the files will be automatically saved to the default printer filename. This function may be overridden with the 3780Plus -R command line option (see **1.1 The 3780Plus Command Line** in **Chapter 1 - Operation** for details).

3.18.1 UNIX/VMS PRint Command

Under UNIX-based and VMS-based operating systems, the PRint command line may specify a print spooler command such as lpr or pr. If no PRint command has been specified since 3780Plus logon, the default command option is lpr for UNIX-based systems and PRINT for VMS-based systems. Printer files (i.e. files containing printer device selection codes) are accumulated serially as PRINT.000, PRINT.001, etc., and spooled to the printer.

If the PRint command is entered with a filename and no command option, the default print spooler is canceled and the files are not spooled to the printer. If you want printer output later on, you must specify a filename and a command option.

You may not enter the PRint command with just the command option. If a special print command is desired, a print filename must also be specified.

Example:

```
PRINT  PRTFILE  lpr  -r
```

Files are accumulated serially as PRTFILE.000, PRTFILE.001, etc., until no more files are received. The received files are spooled to the printer by lpr which automatically removes them when finished with the -r option.

3.18.2 MS-DOS PRint Command

The PRint command option is not valid under MS-DOS operating systems. The PRint command line, however, may specify a printer instead of a file name to send output directly to the printer.

Example:

```
PRINT LPT1:
```

sends the received file directly to printer LPT1. The file is not saved to disk.

Use direct printing with caution! The printer specified must be a high-speed device. If the printer is slow (or runs out of paper or goes off-line, etc.), subsequent delays may cause communication errors.

If the line is down when the PRint command is executed and no branch command follows, 3780Plus will wait until a connection is made before continuing.

PRint is a legal job file command (see JOb).

3.19 QUit - Exit 3780Plus

The QUit command allows a graceful exit from 2780/3780 communications. The QUit command line format is:

QUit [*exit_code*] [-D]

where:

exit_code is an optional decimal number to be returned (via the EXIT() call) to the operating system upon exit. If this option is omitted, 3780Plus will return with an exit code (or return code) of 0.

-D is an option to stop SYNCcable+ operation when not in use by 3780Plus. This option is valid only with SYNCcable+ packages.

The QUit command causes a log off message to be posted to the log file (if open). All pending files are closed including the monitor file, the log file, the receive file, and the print file. If an exit_code is specified, it is returned to the operating system. If an exit_code is not specified, a zero (0) exit code is returned.

The QUit exit code is useful within a job file where you may want to BRanch (see **3.5 BRanch - Branch in Job/Script File Based on Condition**) to different QUit commands depending on the status of the communications session. The status is then passed along to the program or script calling 3780Plus. See your operating system manual for handling exit codes. Table 4.1 below lists the 3780Plus initialization error exit codes. You may designate exit codes for additional error conditions, but to avoid confusion user defined exit codes should start at values higher than the standard exit codes.

QUit does not drop the modem/phone line and no protocol is sent on the line. To drop the line, use the VOice command before QUit.

For an immediate exit, use your operating system's abort key (**CTRL+C** for MS-DOS; **CTRL+** for UNIX-based systems) or the **ESC** key under DOS. 3780Plus will hang up the phone line, post a **3780Plus Terminated** message to the screen and log file, and exit.

QUit is a legal job file command (see JOb).

EXIT CODE	INITIALIZATION ERROR
0	No errors
1	No video.ovr file found
2	No asciiebc.ovr file found
3	Error in asciiebc.ovr file
4	Command line error
5	Configuration file error
6	No device specified
7	Error opening the device
8	Device not active error
9	Can't find SC3780 file
10	Error writing code to SYNCcable+
11	Address error
12	Hardware check error
13	Can't find IRQ level
14	Multiple interrupts pending
15	Job file not found
16	Error in video.ovr file
17	Path error
18	Device in use by 3780Plus
19	Can’t create IAPI shared memory
20	IAPI is already running
21	3780Plus killed
22	Cannot find 3780.CON file
23	Can’t find or load DLL file
24	Can’t find 3780API.EXE or 3780API2.EXE
25	Can’t find baud.ovr file
26	Unsupported baud rate

TABLE 4.1 3780Plus INITIALIZATION ERRORS & EXIT CODES

3.20 REceive - Receive File(s)

The REceive command places 3780Plus in the receive mode and waits to receive one or more files from the remote terminal. Received non-transparent files are normally translated from the EBCDIC character set to the ASCII character set (see **B.4 Character Translation Files** in **Appendix B - File Formats**); received transparent files are normally left "as-is". The REceive command line format is:

REceive [*filename*] [-N|-T|-R|-S|-X]

where:

filename is the optional receive file name.

If no filename has been specified since 3780Plus logon, all received files are accumulated serially as RCVFILE.000, RCVFILE.001, etc. Note: The default file name RCVFILE may be changed (see **B.5 Video Display File** in **Appendix B - File Formats**).

If a filename is specified without a file extension, files are saved with a numeric file extension starting with .000 *without overwriting* current files that have the same name.

Example:

```
RECEIVE mystuff
```

will save data to the file mystuff.000 unless mystuff.000 already exists. If mystuff.000 exists, mystuff.001 is tried, and so on, until a non-existent filename is found.

If a filename is specified with a numeric extension, files are accumulated serially starting at that number. Existing files with the same name are *overwritten*.

Example:

```
RECEIVE  mystuff.200
```

will save data to mystuff.200 regardless of whether a file already exists with that name. The next files received will be saved as mystuff.201, mystuff.202, etc.

If a filename is specified with a non-numeric extension, after the first file is received, additional files are accumulated serially starting with a .000 extension. Existing files with the same name are *overwritten*.

Example:

```
RECEIVE  mystuff.new
```

will save data to mystuff.new regardless of whether a file already exists with that name. The next files received will be saved as mystuff.000, mystuff.001, etc.

Files may be saved without file extensions by following the filename with a period (.).

Example:

```
RECEIVE  NewFile.
```

will save data to NewFile without an extension. Consecutive files are saved as NewFile.000, NewFile.001, etc.

-N allows non-transparent (text) data to be passed through as-is. Without this option, incoming non-transparent files are translated from the EBCDIC character set to the ASCII character set. This option is valid only until an EOT is received from the remote system.

-T allows transparent (binary) data to be translated from the EBCDIC character set to the ASCII character set upon reception. Without this option, incoming transparent files are passed thru as-is. This option is valid only until an EOT is received from the remote system.

If your receive file is not readable and your status line begins with RB:, your host may be sending a transparent EBCDIC file. Try receiving again the REceive -T option.

-R is an option to add carriage return/line feed (CR/LF) characters (DOS/VMS) or a new line (NL) character to the end of every received block.

-S is an option to display the received file to the screen in addition to saving it to a file.

-X allows you to concatenate several incoming files to appear as one file. The -X option ignores incoming ETX characters. The ETX character normally represents a file separator. An incoming EOT character will terminate the file.

Multiple options may be specified together. In this case only one dash (-) should precede all options.

Example:

```
RECEIVE RECFILE -XN
```

may be used to specify both the -X option (to concatenate incoming files) and the -N option (to receive data as-is).

If the MOnitor option is not selected or it is selected with the write to disk option, a moving "R" is displayed on the screen. An "R" indicates 3780Plus has received one block of data. The speed at which this character moves across the screen depends upon block size and data line speed.

After each file is received, a status line is posted giving a completion status message for the receive and the number of data blocks received. See **B.3.2 The Transmit/Receive Status Line** in **Appendix B. File Formats**. If the receive was successful, a **NRMEOF** (Normal End of File) status message will display. See **Table B.2 Receive Completion Status Messages** in **Appendix B. File Formats** for a complete list and **B.3.3 Status Messages** for a complete description of each status message.

In interactive mode, 3780Plus continues to receive files and write them to disk until (1) another receive mode is entered with a PRint, SCreen, or another REceive *filename* command or (2) the receive mode is exited with the **DELETE** key. In a job/script file, 3780Plus receives file(s) only until it (1) receives an end of transmission (EOT), or (2) the receive mode is exited with the **DELETE** key, or (3) the receive timeout has expired, or (4) an error has occurred. Note that if one of a group of receive files is terminated abnormally, the remaining files are not received.

In a job/script file, you may branch on any of the status messages listed in Table B.2. Note, if multiple files are received, you may branch only on the status of the last file received.

If the line is down when the REceive command is executed and no branch command follows, 3780Plus will wait until a connection is made before continuing.

REceive is a legal job file command (see JOb).

3.21 SCreen - Receive File(s) and Display on Screen

The SCreen command places 3780Plus in the receive mode and waits to receive one or more files from the remote. The SCreen command operates in the same manner as the PRint and REceive commands except a file name is not specified and messages are directed to the terminal screen instead of to the printer or disk drive. The SCreen command line format is:

SCreen [-N|-T|-R|-X]

where:

-N allows non-transparent (text) data to be passed through as-is. Without this option, incoming non-transparent files are translated from the EBCDIC character set to the ASCII character set upon reception. This option is valid only until an EOT is received from the remote system.

-T allows transparent (binary) data to be translated from the EBCDIC character set to the ASCII character set upon reception. Without this option, incoming transparent files are passed through as-is. This option is valid only until an EOT is received from the remote system.

-R is an option to add carriage return/line feed (CR/LF) characters for DOS and VMS or a new line (NL) character for UNIX to the end of every received block.

-X allows you to concatenate several incoming files to appear as one file. The -X option ignores incoming ETX characters. The ETX character normally represents a file separator. An incoming EOT character will terminate the file.

Multiple options may be specified together. In this case only one dash (-) should precede all options.

Example:

```
SCREEN -XN
```

may be used to specify both the -X option to concatenate incoming files and the -N option to receive data as-is.

Example:

```
KEY LOGON CHICAGO
SCREEN
```

sends a logon message to the host and displays the welcome message from the host on the screen.

If a binary (transparent) file is received, it is not displayed on the screen but saved to disk under the last receive file name. This avoids problems displaying non-ASCII characters. If the file is received in EBCDIC, you may translate and display this file to the screen with the SCreen -T command line option.

After each file is received, a status line is posted giving a completion status message for the receive and the number of data blocks received. See **B.3.2 The Transmit/Receive Status Line** in **Appendix B. File Formats**. If the receive was successful, a **NRMEOF** (Normal End of File) status message will display. See **Table B.2 Receive Completion Status Messages** in **Appendix B. File Formats** for a complete list and **B.3.3 Status Messages** for a complete description of each status message.

In interactive mode, 3780Plus continues to receive files and write them to disk until (1) another receive mode is entered with a PRint, SCreen, or another REceive *filename* command or (2) the receive mode is exited with the **DELETE** key. In a job/script file, 3780Plus receives file(s) only until it (1) receives an end of transmission (EOT), or (2) the receive mode is exited with the **DELETE** key, or (3) the receive timeout has expired, or (4) an error has occurred. Note that if one of a group of receive files is terminated abnormally, the remaining files are not received.

In a job/script file, you may branch on any of the status messages listed in Table B.2. Note, if multiple files are received, you may branch only on the status of the last file received.

If the line is down when the SCreen command is executed and no branch command follows, 3780Plus will wait until a connection is made before continuing.

SCreen is a legal job file command (see JOb).

3.22 SLeep - Pause Specified Seconds

The SLeep command allows you to pause the specified amount of time. The format of the SLeep command is:

SLeep *seconds*

where:

seconds is the number of seconds to pause before continuing with the next 3780Plus command.

Example:

```
1 AUTODIAL 397-8110 R1
BRANCH NOT BUSY TO 999
SLEEP 60
BRANCH ON TRUE TO 1
999 BRANCH ON FAIL TO 1
KEY LOGON DNJ
```

In the above sequence, if the remote modem is busy 3780Plus will wait one minute (60 seconds) before attempting to redial.

After a SLeep command, a status line is not posted but you may branch on one of the following status messages: **OK** if the pause is completed, **ABORT** if SLeep is aborted with the **DELETE** key, or **FAIL** if the seconds value is invalid. See **B.3.3 Status Messages** in **Appendix B - File Formats** for details.

SLeep is a legal job file command (see JOb).

3.23 STart - Display or Start Counter

The STart command displays the current counter values or initializes one of three counters. The format of the STart command is:

STart [[COUNTER*c*]=*x*]

where:

c is the number of the counter (1 through 3).

x is the value used to initialize the specified counter. If this option is not specified, the counter is initialized to 1.

If the STart command is entered alone, 3780Plus displays the current values for each counter.

Counters may be used to count the number of repetitions of a function. The contents of a counter may be accessed when counter is enclosed in % characters or preceded by a $ character. For example, the string %COUNTER1% or $COUNTER1 in any command is replaced with the current value of COUNTER1.

Example:

```
TOKEN ON
START COUNTER1=1
10 RECEIVE newfile
+COUNTER1
BRANCH ON %COUNTER1% < 4 TO 10
TEXT signoff
```

In the example above, 3780Plus would receive three (3) files, newfile.000 through newfile.002. It would then send a file containing the signoff message.

The contents of a counter may be accessed when counter is preceded by a % or $ character. For example, the string %COUNTER1% or $COUNTER1 in any command is replaced with the current value of COUNTER1. Note: The 3780Plus -K command line option or any form of the TOken command (except the TOken OFF command) must be used to enable this counter variable.

Example:

```
TOKEN ON
START COUNTER1=1
10 RECEIVE file$COUNTER1.new
+COUNTER1
BRANCH ON $COUNTER1 < 4 TO 10
TEXT signoff
```

In the example above, 3780Plus would receive three (3) files: file1.new, file2.new, and file3.new. It would then send a file containing the signoff message.

Counters may also be used to access token variables when counter is preceded by the %% or $$ characters. For example, the string %%COUNTER1 or $$COUNTER1 in any command is replaced with the token for the current value of COUNTER1.

Example:

```
TOKEN  1=one 2=two 3=three
START  COUNTER1=1
10  RECEIVE  file$$COUNTER1.new
+COUNTER1
BRANCH  ON  $COUNTER1  <  4  TO  10
TEXT  signoff
```

In the example above, 3780Plus would receive three (3) files: fileone.new, filetwo.new, and filethree.new. It would then send a file containing the signoff message.

See also **3.7 +COUNTER - Increment Counter**, **3.8 -COUNTER - Decrement Counter**, **3.5.4 BRanch ON|NOT %COUNTER*c*|$COUNTER*c* <|=|> *number* TO *label***, and **3.27 TOken - Enable, Disable, Display, or Set Token Variables**.

STart is a legal job file command (see JOb).

3.24 SYstem - Execute an Operating System Command or Application Program

The SYstem command allows operating system commands and application programs to be executed from within 3780Plus. The SYstem command line format is:

SYstem *command*

where:

command is the operating system command or application program to be executed.

Because communication line monitoring is halted during this process, this command should be used only when there is no line activity.

Example:

```
SYSTEM DIR
```

will execute the directory command within DOS.

Example:

```
SYSTEM  myprogram
```

will execute a user application program named myprogram.

3780Plus posts the following message upon completion of the operating system command:

Returning to communications .....

SYstem returns the exit code from the command supplied to the operating system, allowing you to BRanch on this status. On UNIX-based systems the high 8 bits of the return code represent the exit code from your program and the low 8 bits of the return code indicate the error status of your program (00 if no errors). See **3.5.2 BRanch ON|NOT *return_code* TO *label*** for details.

With MS-DOS, 3780Plus must be able to locate the COMMAND.COM file to execute a DOS command. See appropriate *Installation* section for details. DOS wildcards should be used with caution.

SYstem is a legal job file command but should be used with caution, especially in cases where a response to a prompt is required (see JOb).

3.25 TAble - Display or Change Translation Table(s)

The TAble command provides an easy method of viewing or changing the outgoing (ASCII to EBCDIC) and the incoming (EBCDIC to ASCII) character translations. The TAble command line format is:

TAble [*outfile* [*infile*]]

where:

outfile is the outgoing character (ASCII to EBCDIC) translation file previously created with a text editor. The default translation file is asciiebc.ovr. See **B.4 Character Translation Files** in **Appendix B - File Formats** for the required file format.

infile is the incoming character (EBCDIC to ASCII) translation file previously created with a text editor. See **B.4 Character Translation Files** in **Appendix B - File Formats** for the required file format.

TAble, when executed with two filenames, reads the translations found in the previously created files. Translations found in the first file are used for subsequent ASCII to EBCDIC conversions (for outgoing data). Translations found in the second file are used for subsequent EBCDIC to ASCII conversions (for incoming data).

Example:

TABLE asciiebc.cap ebcascii.ovr

changes the outgoing translation table to convert all lowercase characters to uppercase characters before transmission. Incoming characters are translated normally.

TAble, when executed with a single filename, reads the translations found in the previously created file. These translations are used for subsequent ASCII to EBCDIC (outgoing) character conversions. If 3780Plus is configured for a single translation file, this file is also used for EBCDIC to ASCII (incoming) character conversions. See **B.4 Character Translation Files** and **B.5 Video Display File** in **Appendix B - File Formats** for details.

TAble, when executed without a filename, displays two screens of the current outgoing (ASCII to EBCDIC) translations then two screens of the current incoming (EBCDIC to ASCII) translations.

After a TAble *outfile infile* command, a status line is not posted but you may branch on one of the following status messages: **OK** if the translation table(s) loaded properly, **FAIL** if there was an error in the table(s), or **NOFILE** if the specified file(s) could not be found or opened. See **B.3.3 Status Messages** in **Appendix B - File Formats** for details.

TAble *outfile infile* or TAble *filename* are legal job file commands, but TAble by itself is not allowed in a job file (see JOb).

3.26 TExt - Transmit Text File(s)

The TExt command may be used to transmit a file to the remote system. These files are normally translated from the ASCII character set to the EBCDIC character set then sent in non-transparent mode. This is the most commonly used method of transmission. The TExt command line format is:

TExt *filename* [*RemoteFilename*] [-B|-E|-N|-R|-X]

where:

filename is the file or files to be sent to the remote system. Wildcards may be used within file names.

Example:

```
TEXT  *.ovr
```

sends files beginning with the .ovr file extension. Note that if one of a group of transmitted files specified by a wildcard is terminated by anything other than a **NRMEOF** (normal end of file) status, the remaining specified files are not sent and the command is aborted.

RemoteFilename is an optional remote file name. This should be used only in a 3780Plus to 3780Plus connection. This filename is assigned to the file received by the remote processor. See **2.20.1 File Naming** for details.

-B option allows data to be translated from the ASCII character set to the EBCDIC character set before being transmitted in transparent (binary) mode. This differs from the BInary -T command because it translates special characters (i.e. CR/LF to RS).

-E allows you to send multiple files to the host without releasing the line. The normal mode is for all transmit commands to send an EOT after each file. The -E option suppresses the EOT allowing you to retain control of the line.

-N allows non-transparent (text) data to be passed through as-is. Without this option, files are translated from the ASCII character set to the EBCDIC character set before transmission. Use this option with caution. Normal ASCII characters (i.e. 2 or 7) interfere with protocol characters preventing transmission.

-R allows record separators (IRS) to be omitted on files transmitted. This option essentially removes carriage return, line feed, and new line characters, and packs the data into one record. Without this option, carriage return/linefeeds (DOS) and new lines (UNIX/XENIX/AIX) are translated into record separators (IRS). In general, most host computers require record separators in non-transparent (text) files. This option is valid only in 3780 mode.

-X allows you to concatenate several files to appear as one file to the host. The -X option suppresses the ETX (End of Text) at the end of the last block in the file and the EOT. The ETX character represents the file separator character to the host. You should not use the -X option on the last file you send to insure that it is properly terminated with an ETX.

Note: The EOt command does not send an ETX, so if you have just used the -X option and want to close the transaction with the EOt command, you will not have sent the ETX. This is considered bad form within the protocol and will cause unpredictable results at the receiving end.

Multiple options may be specified together. In this case only one dash (-) should precede all options.

Example:

```
TEXT  SIGNON.FIL  -RX
TEXT  *.C  -RX
TEXT  SIGNOFF.FIL  -R
```

would send the SIGNON.FIL file, all files ending in the .C file extension, and the SIGNOFF.FIL file as one file (-X) without record separators (-R).

Word processors create documents that appear to be ASCII files, and the temptation is to transmit these files using the TExt command. However, some word processing packages change the high bit on each character, specifying a command to the word processor. If you suspect this is the case with your word processor, send document files using the BInary command.

If the MOnitor option is not selected, or the MOnitor option is selected with the write to disk option, a moving "T" is displayed on the screen during transmission. A "T" indicates the successful transmission of one block of data. The speed at which this character moves across the screen depends upon block size and data line speed.

After each file is transmitted, a status line is posted giving a completion status message for the transmission and the number of data blocks sent. See **B.3.2 The Transmit/Receive Status Line** in **Appendix B. File Formats**. If the transmission was successful, a **NRMEOF** (Normal End of File) status message will display. See **Table B.3 Transmit Completion Status Messages** in **Appendix B. File Formats** for a complete list and **B.3.3 Status Messages** for a complete description of each status message.

In a job/script file, you may branch on any of the status messages listed in Table B.3. Note, if a wildcard is used to transmit multiple files, you may branch only on the status of the last file transmitted.

If the line is down when the TExt command is executed and no branch command follows, 3780Plus will wait until a connection is made before continuing.

2.26.1 File Naming

In a 3780Plus to 3780Plus connection only, an optional destination filename may be specified as the second file name of a TExt or BInary command. This filename is assigned to the file received by the remote processor.

Remote filenaming is a 3780Plus function and not an IBM 2780/3780 function and, therefore, will not work when sending to mainframes or other 3780 packages.

Example:

```
TEXT  A:MY.TXT  YOUR.TXT
BINARY  /USER/MY.EXE  YOUR.EXE
```

In this example, the receiving computer would name the received files YOUR.TXT and YOUR.EXE, overriding any filename given in the remote REceive command. If the screen or printer was enabled at the receiving end, however, the files would be directed to the screen or the default printer name and would not be saved to the specified filenames.

Remote filenaming supports wildcards. The remote name, however, must be specified with the same name as the original.

Example:

```
BINARY  *.C  *.C
```

This will send any files with the extension .C in transparent mode to the remote terminal and give them the same name as the original files.

If you do not specify the remote name to be the same as the original, you will receive the message:

 # Wild card file parameters must match to use remote file naming.

The 3780Plus file naming convention is:

:FILEID*filename*<0x00><CR><LF>

If the above sequence appears anywhere within a file, the string after :FILEID is the filename under which received data is stored. This record, up to and including the <CR><LF>, is then discarded.

With MS-DOS, 3780Plus will not overwrite files on the receiving end. If the specified filename already exists, the file will be saved to the default REceive filename.

With UNIX/XENIX, 3780Plus will overwrite files on the receiving end unless the -F command line option is specified. See **1.1 The 3780Plus Command Line** in **Chapter 1 - Operation** for details.

TExt is a legal job file command (see JOb).

3.27 TOken - Enable, Disable, Display, or Set Token Variables

The TOken command enables, disables, displays, changes, or adds to the current token values. The format of the TOken command is:

TOken [ON|OFF]
or
TOken *token* [*token*...]
or
TOken *x=token* [*x=token*...]

where:

ON — is an option to enable token, variable, and counter processing. Token, variable, and counter processing may be enabled with any form of the TOken command (except TOken OFF) or the 3780Plus -K command line option.

OFF — is an option to disable token, variable, and counter processing. Disabling this processing allows you to send files and/or keyboard messages containing the $ and % characters. Token, variable, and counter processing is disabled by default.

token — is an optional variable for parameter substitution. Up to 19 tokens may be supplied. If tokens are specified, tokens, variable, and counter processing are automatically enabled.

x — is the number of the token to be added or changed. *x* may be a value between 1 and 19 inclusive.

If the TOken command is entered without options, 3780Plus displays the current status of the token/variable/counter processing and values for each of the tokens.

Tokens are similar to MS-DOS replaceable parameters or UNIX/XENIX positional parameters. The first token may be accessed with %1 or $1, the second with %2 or $2, and so on. These tokens may be used anywhere within 3780Plus, except as command names or labels.

Example:

```
TOKEN file1 file2 file3
TEXT $1 $2
RECEIVE %3
```

would result in:

```
TEXT file1 file2
RECEIVE file3
```

which would send file1 to the remote 3780Plus as file2 and save the received file as file3.

Tokens may be used in combination with environment variables (also referred to as named variables, user-defined variables, or shell variables). These environment variables may be accessed with the %*variable*% or $*variable* command.

For example, if HOME=\public in the environment, the following commands:

```
TOKEN  5=file5  6=file6  7=file7
TEXT  $HOME\$5  $6
RECEIVE  %HOME%\%7
```

would result in:

```
TEXT  \public\file5  file6
RECEIVE  \public\file7
```

which would send \public\file5 to the remote 3780Plus as file6 and save the received file as \public\file7. See your operating system manual for information on setting environment variables.

Tokens may also be set from the 3780Plus command line (see **1.1 The 3780Plus Command Line** in **Chapter 1 - Operation**) or set/changed with the EXecute command (see **3.11 EXecute - Execute Commands from a Job/Script File**).

TOken is a legal job file command (see JOb).

3.28 VOice - Disconnect Phone Line and Disable Autoanswer

The VOice command causes the 3780Plus program to enable the handset and exclude the modem so that dialing or voice communication may occur. The VOice command has no options; the VOice command line format is:

VOICE

The VOice command transmits the 3780 hang up message (DLE EOT), hangs up the phone line, then returns the command prompt indicating that 3780Plus is ready to accept another command.

Example:

```
AUTODIAL  1-815-555-1212
TEXT   FILE.NEW
VOICE
QUIT
```

The above job file would dial the remote, send a text file, disconnect the line and disable autoanswer then quit 3780Plus.

Note: If the hang up message (DLE EOT) is received by 3780Plus during the communications process, 3780Plus will drop the phone line for one second then return to the answer/receive mode for further transactions.

VOice is a legal job file command (see JOb).

3.29 XX - Post Current 3780Plus Information

The XX command writes current 3780Plus information such as the 3780Plus version number, the configuration file, and the hardware settings to the screen and to the log file (if open). The XX command has no options; the XX command line format is:

XX

The XX command posts a message similar to:

```
3780Plus (R. 04026) under UNIX with the IAPI available.
                    Working Directory:  /u/3780.
                    ASCII <-> EBCDIC Table is: asciiebc.ovr.

                                 CONFIGURATION: DEFAULT
Protocol Type               = 3780
Line Type                   = Switched (DSR)
Terminal Type               = Primary
Terminal Identification     = NULL

Transmission Data Block Format              Modem Hardware Parameters

  Record Size               = 80
  Blocking Factor           = 1                Modulation Type:
  Space Compression         = ON                 V.26 bis or Bell 201 C (2400 BPS)
  New Line Suppression      = OFF              Dialing Method: Synchronous


Protocol Line Parameters

  Repeat Limit              = 4
  Retransmission Limit      = 4
  Wait Limit                = 10
  Delay Limit               = 100
  Bid Limit                 = 15
  Idle Timeout              = OFF
  Receive Limit             = 60
                       The Configuration File is: DEFAULT.
                    Software is running in FOREGROUND
                    SYNcable
                    - 3780plus version 10/03/95
                    - HV2.14
                    - lead is 100%
                    - underrun count is 0
                    Modem dialing method - UDS BSC.
                    SYNCcable (4800). . .
                    Using device '/dev/tty1a'.
```

XX is a legal job file command (see JOb).

3.30 ## - Job/Script Comment Line

The ## command allows you to add comments to job files. The format of the ## command is:

[*comment*]

where:

comment is an optional statement that describes job file functions. This comment may be up to 80 characters in length.

comments will be displayed in the log file. To add comments to a job file without having them displayed in the log file, start the comment line with ###.

Example:

```
## This comment will be displayed in the log file.
### This comment will not be displayed in the log file.
```

The ## command is available only from within 3780Plus job files. It is not available for use in the interactive mode and is not displayed on the HELP menu.

Chapter 4.
3780Plus Tutorial

This chapter contains several examples of hypothetical 3780Plus sessions. The examples are set up as job files which could be run unattended by using the -J *jobfile* option when executing 3780Plus or by entering the EXecute *jobfile* command within 3780Plus. These commands could also be entered interactively without the BRanch commands. Where applicable, both sides of the communication session are shown. This chapter contains the following examples:

- Retail sales
- Remote job entry
- Insurance batch transactions I
- Insurance batch transactions II - using tokens
- Insurance batch transactions III - using environment variables

A section discussing the session follows each example.

These three examples demonstrate some of the flexibility inherent in 3780Plus. A series of commands can be entered interactively or from a job file to handle almost any of your data communication needs.

For more detailed information on the 3780Plus commands, see **Chapter 3 - 3780Plus Commands**.

4.1 Retail Sales

A retail sales outlet must send weekly reports to the headquarters in Chicago. These reports include: current inventory, orders, sales, and employee information. The store receives from Chicago: payroll information, current stock on ordered inventory, and pricing information.

Store 100 job file

```
KEY  signon store 100
SCREEN
TEXT  Inventory
TEXT  Orders
TEXT  Sales
TEXT  Employee
RECEIVE  Payroll.new
PRINT  Stock.new lpr
PRINT  Price.new lpr
KEY  signoff store100
SCREEN
QUIT
```

Chicago job file

```
100  RECEIVE  Signon.100
KEY  store 100 signed on
RECEIVE  Inventory.100
RECEIVE  Order.100
RECEIVE  Sales.100
RECEIVE  Employee.100
TEXT  Payroll100
TEXT  Stock100
TEXT  Price100
SCREEN
KEY  store 100 signed off
QUIT
```

The above job files assume both terminals are running 3780Plus. Either side may be replaced with another 3780 device if it performs the same functions. Store 100 started off the job by sending a signon message to Chicago which was saved to the disk file Signon.100. Chicago's response was not saved to disk but directed to Store 100's screen. Store 100 then sent a series of files to Chicago, which received them and saved the files to disk with the designated filenames.

Chicago then transmitted payroll, stock, and pricing information. Store 100 received the payroll information to disk as Payroll.new then used the PRint command to print stock and pricing information. These print files were saved to disk as Stock.new and Price.new, and immediately spooled to the printer with the lpr command option.

Store 100 sent a signoff message which was displayed on the screen by Chicago. Chicago responded with a signoff response which was displayed on the screen of Store 100. Store 100 and Chicago ended their job files with the QUit command which exited the 3780Plus package.

4.2 Remote Job Entry

A bank branch office wishes to run a remote job entry session on their host computer.

Bank branch office job file

```
CONFIG  2780
AUTODIAL  1-800-555-1212
TEXT  signon
RECEIVE  signon.rsp
TEXT  jclbeg.file -E
TEXT  source -E
TEXT  jclend.file -E
EOT
123  RECEIVE  results
BRANCH  ON  NRMEOF  TO  123
TEXT  logoff
VOICE
QUIT
```

In the above example, the default 2780 configuration file was loaded to configure for 2780 communications. If the configuration file was specified with the -C 2780 command line option, the COnfig command would not be necessary.

The job file begins with an AUtodial command to call the host computer. Note: This office must have a CLEO supported autodial modem to execute the AUtodial command.

A signon message was transmitted to the host, and the response was received by 3780Plus and stored in file signon.rsp. Next, begin job control, source, and end job control files were transmitted to the host for processing. The -E option was used to "piggyback" files without an intervening EOT. The EOT (End of Transmission) was sent following transmission of the last file to allow the remote system to transmit.

The REceive command allows a file from the host to be stored as results.000. If a file was received OK, the job file branches back to the REceive command. This allows an unknown number of files to be received. If more than one file was received from the host, the files would be accumulated serially as results.000, results.001, results.002, etc.

Note: If a file with a printer selection code was received from the host (see **C.2 Device Selection** in **Appendix C - Multipoint Operation and Device Selection**), it would be stored as PRINT.000 instead of results.000. On UNIX or XENIX versions, PRINT.000 would immediately be spooled to the printer by lpr. PRint and lpr are the default parameters for UNIX and XENIX versions of 3780Plus, and are used if a print file is received and the PRint command has not been executed since 3780Plus logon. If more than one printer file was received from the host, the files would be accumulated serially as PRINT.000, PRINT.001, PRINT.002, etc.

If a file (or subsequent file) was not received within the time specified by the Receive Limit or a file was received in error, the job file resumes at the TExt logoff command. A logoff message terminates the session with the host, the VOice command drops the phone line, and QUit exits 3780Plus.

4.3 Insurance Batch Transactions I

A central data processing center in New York collects various reports from insurance claims and sales offices around the country. These reports are sent nightly during off peak telephone access periods. The reports to New York include: insurance claims filed, adjuster reports, and new policies and coverage updates. Each office receives from central data processing: dividend and policy updates, potential local customers from national advertising, and claims processing information.

New York job file

```
## OFFICE 43 TRANSACTIONS:
AUTODIAL 18005551212 R5
BRANCH ON FAIL TO 678
KEY signon from New York
SCREEN
RECEIVE dataof43



TEXT update43
TEXT custm43
TEXT claims43 claims

KEY logoff from New York
SCREEN

VOICE

## OFFICE 44 TRANSACTIONS:
678 AUTODIAL 18005552121
    :
```

Office 43 job file

```
## NEW YORK TRANSACTIONS:
ANSWER 480
BRANCH NOT OK TO 1
RECEIVE signon
KEY signon accepted
TEXT newclaim -x
TEXT adjust -x
TEXT newpolcy
LOG sent files
MONITOR dump523
RECEIVE policy.upd
PRINT mail.lst
RECEIVE
MONITOR
SCREEN
KEY logoff accepted
SYSTEM del signon.000
1 VOICE
QUIT
```

NOTE: Actual job files would not have embedded blank lines. Spacing was added to match up the receive and transmit sides of each transaction.

All transactions in this session take place without human intervention through the use of job files and the AUtodial command. The central data processing center in New York automatically calls each office for their reports. Note: New York must have a Cleo supported autodial modem to execute the AUtodial command; the other sites do not need an autodial modem to autoanswer.

Office 43 begins with a comment line identifying the job file. This is followed by an ANswer command to hang up the previous session and wait 480 minutes (8 hours) for an incoming call. When an incoming call is detected, the BRanch is not executed and the job file continues at the REceive command. If the 480-minute wait period expires, the BRanch is performed and the job file ends with the VOice and QUit commands.

New York begins with a comment line identifying the office (43) to call. This is followed by an AUtodial command to call Office 43. If the first AUtodial command makes a connection, the branch is not performed and the job continues as usual. If the AUtodial command fails, 3780Plus jumps to 678, the next AUtodial command, and the job resumes at this point.

New York's signon message is saved to disk at Office 43 as signon.000. Office 43's signon response is displayed on New York's screen. Office 43 then transmits three text files to New York which are saved as one file dataof43.000. This example of "piggybacking" illustrates that only an End of Text (ETX) terminates a file and an End of Transmission (EOT) terminates a REceive command in a job file. The -X option makes all three files look like one file to New York. If the -X option was omitted from the TEXT newclaim -X command, New York, upon receiving TEXT's automatic ETX and EOT, would have continued with the next command in its job file (i.e. TEXT update43). Note: The TEXT newpolcy command automatically sends an ETX and EOT.

The message "sent files" is posted to the log file. A monitor file with the filename dump523 is created with the MOnitor command. Dump523 will store all protocol and data sent or received until closed by the MOnitor command later in the job file.

New York now transmits policy updates which are saved to disk by Office 43 as policy.upd. New York next transmits a customer mailing list which is saved to disk by Office 43 as print file mail.lst. Note that no command option was specified after the filename in the PRint command, so printer spooling will not occur. The PRint command without a command option functions almost identically to the REceive command. One important difference is that printer escape sequences are translated to the appropriate action when received with the PRint command, while the escape sequences are saved to disk with the REceive command.

New York now transmits a claims file which is saved to disk by Office 43 as claims. Notice that a receive filename was not specified after the REceive command. Even if a filename had been specified, the file would have been saved as claims because a transmit filename overrides a receive filename. (See **3.26.1 File Naming** in **Chapter 3 - 3780Plus Commands**).

The MOnitor command in Office 43's job file closes the file dump523 which contains the protocol and data received at Office 43 since the command was invoked. The monitor file is very useful for diagnostic purposes, but it consumes a large amount of disk space. The MOnitor command should be used only when you suspect protocol problems.

To end the session, logoff sequences are exchanged and displayed on the respective screens. On Office 43, the SYstem command is used to execute the DOS command to delete the signon file received to disk earlier in the session. New York and Office 43's VOice commands exchange the 3780 hangup message (DLE EOT) and drop the line. The QUit command causes Office 43 to exit 3780Plus. New York is now ready to call the next office (identified by the comment line) using the AUtodial command and continue with transactions to Office 44.

4.4 Insurance Batch Transactions II - Using Tokens

The previous insurance transactions may be accomplished with a shorter job file in the New York office. This job file could run against the same Office 43 job file in the prior example. This New York job file takes advantage of 3780Plus' token variable support. Tokens may be used to pass information into the job file from the 3780Plus command line. In this case the information passed is the office number and the phone number of the office to call. The batch or script file used to start New York's job file would look like this:

```
3780Plus  -J  REPORTS.JOB  -K  43  18005551212
3780Plus  -J  REPORTS.JOB  -K  44  18005552121
    :
```

New York job file (REPORTS.JOB)

```
##  ALL OFFICE TRANSACTIONS:
AUTODIAL  %2  R5
BRANCH  ON  FAIL  TO  678
KEY  signon from New York
SCREEN
RECEIVE  dataof%1
TEXT  update%1
TEXT  custm%1
TEXT  claims%1  claims
KEY  logoff from New York
SCREEN
VOICE
QUIT
```

Resulting New York job file

```
##  ALL OFFICE TRANSACTIONS:
AUTODIAL  18005551212  R5
BRANCH  ON  FAIL  TO  678
KEY  signon from New York
SCREEN
RECEIVE  dataof43
TEXT  update43
TEXT  custm43
TEXT  claims43  claims
KEY  logoff from New York
SCREEN
VOICE
QUIT
```

In this example, the 3780Plus -K command line option is followed by token #1, the office number, and token #2, the phone number of the office to dial. In the first 3780Plus execution, the %2 in the AUTODIAL %2 R5 job file command is replaced by the second token (18005551212) resulting in the command AUTODIAL 18005551212 R5. The %1 in the RECEIVE dataof%1, TEXT update%1, TEXT custm%1, and TEXT claims%1 claims commands are replaced by the first token (43). The Resulting New York job file above shows the results of executing the first 3780Plus command line above; note that this result is identical to the original New York job file.

4.5 Insurance Batch Transactions III - Using Environment Variables

The previous insurance transactions may also be accomplished with a slight variation to the New York job file. This New York job file takes advantage of 3780Plus' environment variable support. Environment variables may be used to pass information from the operating system into the job file. The same office number and the phone number is passed. The DOS batch file used to start New York's job file would look like this:

```
SET  OFFICE=43
SET  PHONE=18005551212
3780Plus  -J  REPORTS.JOB  -K
SET  OFFICE=44
SET  PHONE=18005552121
3780Plus  -J  REPORTS.JOB  -K
    :
```

New York job file (REPORTS.JOB)

```
##  ALL OFFICE TRANSACTIONS:
AUTODIAL  $PHONE  R5
BRANCH  ON  FAIL  TO  678
KEY  signon from New York
SCREEN
RECEIVE  dataof$OFFICE
TEXT  update$OFFICE
TEXT  custm$OFFICE
TEXT  claims$OFFICE  claims
KEY  logoff from New York
SCREEN
VOICE
QUIT
```

Resulting New York job file

```
##  ALL OFFICE TRANSACTIONS:
AUTODIAL  18005551212  R5
BRANCH  ON  FAIL  TO  678
KEY  signon from New York
SCREEN
RECEIVE  dataof43
TEXT  update43
TEXT  custm43
TEXT  claims43  claims
KEY  logoff from New York
SCREEN
VOICE
QUIT
```

In this example, the office number is set as the DOS environment variable OFFICE and the phone number of the office to dial is set as the DOS environment variable PHONE. Note: The 3780Plus -K command line option is required to enable environment variable support.

In the first 3780Plus execution, the $PHONE in the AUTODIAL $PHONE R5 job file command is replaced by the environment variable PHONE (18005551212) resulting in the command AUTODIAL 18005551212 R5. The $OFFICE in the RECEIVE dataof$OFFICE, TEXT update$OFFICE, TEXT custm$OFFICE, and TEXT claims$OFFICE claims commands are replaced by the environment variable OFFICE (43). The Resulting New York job file above shows the results of executing the first 3780Plus command line above; note that this result is identical to the original New York job file.

4.6 Book Updates

Two writers in different parts of the country are co-writing a book. Each evening the writers exchange the portions of the book each has completed. Each week one of the writers must send weekly updates to the publisher for review. Because varying amounts of the book are completed at any given time, the writers need only specify the phone number they wish to dial, the number of chapters they wish to exchange and the chapter names.

Writer #1's job file

```
## SEND TO WRITER 2:
AUTODIAL %1 R5
BRANCH ON FAIL TO 999
KEY Hello from Maine
START COUNTER1=0
START COUNTER2=3
100 BINARY %%COUNTER2 %%COUNTER2200 RECEIVE FILE
BRANCH NOT NRMEOF TO 999
+COUNTER1
+COUNTER2
BRANCH ON %COUNTER1 < %2 TO 100
KEY That's all!
## RECEIVE FROM WRITER 2:
200 RECEIVE FILE
BRANCH NOT NRMEOF TO 999
BRANCH ON SIZE > 15 TO 200
KEY Bye from Maine
999 VOICE
QUIT
```

Writer #2's job file

```
## RECEIVE FROM WRITER 1
ANSWER 60
BRANCH ON FAIL TO 999
SCREEN
BRANCH NOT NRMEOF TO 999
BRANCH ON SIZE > 15 TO 200
## SEND TO WRITER 1:
START COUNTER1=0
START COUNTER2=2
100 BINARY %%COUNTER2 %%COUNTER2
BRANCH NOT NRMEOF TO 999
+COUNTER1
+COUNTER2
BRANCH ON %COUNTER1 < %1 TO 100
KEY That's it!
SCREEN
999 VOICE
QUIT
```

Appendix A.
Modem Support

3780Plus must connect to another 3780 device via modems (one for each 3780 device), a modem eliminator, or a null modem. This appendix contains information on the following modem types:

- Internal Cleo modems
- External autodial modems
- External non-autodial modems
- Modem eliminators
- Null modems

For more information, see **1.5 Connecting to the Remote** in **Chapter 1 - Operation**. For information on the AUtodial command, see **3.3 AUtodial - Automatic Dial** in **Chapter 3 - 3780Plus Commands**. For more detailed information on the COnfig command, see **3.6 COnfig - Display or Change Configuration** in **Chapter 3 - 3780Plus Commands** and **Chapter 2 - Configuration**.

A.1 Internal Cleo Modems

3780Plus operates on a variety of internal modems (i.e. modems that are installed inside your computer). All internal modems support automatic dialing and automatic answering.

The following 3780Plus COnfig parameters must be set:

Line Type	=	Switched Line[1]
Modulation	=	modem type required[2]
Dialing Method	=	Synchronous

See **1.5.1 Automatic Dialing** in **Chapter 1 - Operation** for details on autodialing. See the appropriate *Installation* section for more information on individual internal modems.

[1] This is the default setting for all internal modems. Some internal modems may be configured to operate on a leased line. To run on a leased line, the Line Type setting should be changed to Leased Line. Switch and/or jumper changes must be made on the modem, and a different phone cable is required. See the appropriate *Installation* section for details.

[2] This setting is ignored on modems that only support one synchronous modem type.

A.2 External Autodial Modems

3780Plus operates with a variety of external modems (i.e. modems outside your computer). 3780Plus uses the following methods to automatically dial your modem.

A.2.1 AT Command Set Modems

3780Plus supports the Hayes AT command set to configure and autodial a wide variety of modems. AT commands are sent asynchronously to the Hayes compatible modem. Once the connection is made, communication changes from asynchronous to synchronous.

The following 3780Plus COnfig parameters must be set:

Line Type	=	Leased Line
Modulation	=	modem type required[1]
Dialing Method	=	AT Command.

Supported AT command modems include:

- Motorola/UDS V.34R (CCITT V.34)
- Motorola/UDS V.3400 (CCITT V.34)
- UDS V.32 (CCITT V.32)
- UDS V.32E (CCITT V.32)
- Hayes V-Series ULTRA Smartmodem 9600 (CCITT V.32)
- Penril Alliance V.32/14.4M (CCITT V.32bis or Bell 208)
- USRobotics Courier V.32 (CCITT V.32)
- MultiTech MultiModemV32 (CCITT V.32)
- Hayes SmartModem 2400 (CCITT V.22bis, CCITT V.22, or Bell 212)
- Racal-Vadic 2400PA (CCITT V.22bis, CCITT V.22, or Bell 212)
- GVC SuperModem2400 (CCITT V.22bis, CCITT V.22, or Bell 212)
- MultiTech Multimodem224 (CCITT V.22bis, CCITT V.22, or Bell 212)

See **1.5.1 Automatic Dialing** in **Chapter 1 - Operation** for details on autodialing.

[1] For external V.34 28,800 bps modems, set the Modulation Type to 38,400 BPS.

The following AT commands are issued by the 3780Plus autodial:

V	Return numeric result codes
Q	Return result codes/messages
E	Disable echo back
S8=5	Pause 5 seconds
&C1	Carrier Detect (CD) follows line
&D1	Switch to command mode when DTR drops
M1	Speaker on until line connect
&M1	Change to synchronous mode when carrier detected
S7=*xx*	Wait *xx* seconds for call to complete[1]
S0=1	Autoanswer on the first ring
S0=0	Disable autoanswer
DT or DP	Tone dial a number or Pulse dial a number[1]

[1] The appropriate commands are sent according to the autodial command given by the user.

3780Plus sends the command ATVQE then the modem setup string. The modem setup string may be controlled by message #132 of the video.ovr file. An alternate setup string may be sent by inserting the new sequence between the ^B and ^C characters in message #132. The default modem setup string is:

AT S8=5&C1&D1M1&M1

Additional AT modem setup string(s) may be sent with 3780Plus AT AT*xx* command. For instance, to configure the Hayes Ultra 96 modem to connect at the maximum line speed of 2400, use the command "AT ATS37=6". Note: The modem will only accept AT strings when it is off-line.

On AUtodial, 3780Plus sends the command ATS7=*xx* where *xx* is taken from the final T*xx* option of the AUtodial command (the default is 30).

The dial result messages may be modified with message #150 of the video.ovr file. See **B.3.3 Status Messages** in **Appendix B - File Formats** for details.

Note: The AUtodial pause time (T*xx*) is rounded to the next five (5) second interval. To pause less than five seconds, set "S8=" to the required pause time and use a pause time of T5.

A.2.2 Motorola/UDS BSC Modems

3780Plus supports the 3780 BSC protocol to autodial the Motorola/Universal Data Systems bisynchronous 3780 autodial modems. Note: See **A.2.1 AT Command Set Modems** for information on dialing the Motorola/UDS V.32 V.32E, V.34R, V.3400 modems.

The following 3780Plus COnfig parameters must be set:

Line Type	=	Switched Line
Modulation	=	(any)
Dialing Method	=	Synchronous

Supported UDS BSC modems include:

- UDS 201C/D or UDS 2140 (Bell 201)
- UDS 208B/D (Bell 208)
- UDS 2860 (Bell 208 or Bell 201)

UDS 201C/D: The following default settings must be changed for 3780Plus to run properly: **DSR In Dial Mode (S2-6)** must be changed to "Normal" (OFF); and **No Activity Abort (S2-7)** must be changed to "Normal" (OFF).

UDS 208B/D: The following default settings must be changed for 3780Plus to run properly: **DSR Follows RTS (E23/Spare)** must be changed to "Disabled"; **Line Current Disconnect (S3-2)** should be changed to "Enabled" (ON); **DSR In Dial Mode (S3-3)** must be changed to "Normal" (OFF); and **Autodialer (S3-6)** must be changed to "Enabled" (ON).

See **1.5.1 Automatic Dialing** in **Chapter 1 - Operation** for details on autodialing. NOTE: The final T*xx* option of the AUtodial command is invalid with these UDS modems. The default answer back tone detect period is 60 seconds.

A.2.3 Synchronous AutoDial Language (SADL) Modems

3780Plus supports Racal-Vadic's Synchronous AutoDial Language (SADL). Bisynchronous SADL is used to configure and autodial these modems.

The following 3780Plus COnfig parameters must be set:

Line Type	=	Switched Line
Modulation	=	(any)
Dialing Method	=	Synchronous

Supported SADL modems include:

- Racal-Vadic 4850PA (Bell 208)
- Okidata CLD4800A/B (Bell 208)
- Racal-Vadic 9650PA (CCITT V.29)

3780Plus changes several of the programmable options of the modem. These options are listed in Table A.1 below.

OPTION	DEFAULT	CLEO SETTING
#1. Standard Options	ENABLED/1	DISABLED/2
#2. DSR Control	CSI/1	NORMAL/3
#3. CXR Control	CSI/1	CSI/1
#4. Autoanswer	ENABLED/1	ENABED/1
#5. Dial Mode	AUTOSELECT/1	TONE/2 or PULSE/3*
#6. Blind Dialing	DISABLED/1	ENABLED/2
#7. Slave Clock	NOT USED/1	NOT USED/1
#8. Answer Delay	FIRST RING/1	FIRST RING/1
#9. Loss of Carrier Detect	NOT USED/1	NOT USED/1
#10. Failed Call Timer	60 SECONDS/1	30 SECONDS/2 or 60 SECONDS/1*

*These values are set according to the autodial command given by the user.

TABLE A.1 SADL PROGRAMMABLE OPTIONS

The modem setup string is controlled by message #131 of the video.ovr file. An alternate setup string may be sent by modifying the sequence between the ^B and ^C characters in message #131. The default modem setup string is:

O2311221112

3780Plus changes these parameters for each separate autodial sequence. You should note that there are many more options that may be changed. We have left these options unchanged so that you may set them according to your specific situation.

You should be aware of several special options listed below which will significantly impact the performance of your communication session:

OPTION	RECOMMENDED SETTING
#16. Satellite Option	Must be ENABLED if you are on a satellite link.
#17. Clear to Send Delay	Should be long if you are using long distance communications.
#20. Line Current Disconnect	Should be ENABLED so software can sense when the line goes down.

See **1.5.1 Automatic Dialing** in **Chapter 1 - Operation** for details on autodialing.

A.2.4 CCITT V.25bis Modems

3780Plus supports a simplified CCITT V.25bis command set. The synchronous V.25bis Call Request Number (CRN) or Call Request Number with Identification (CRI) command is used to communicate with various V.25bis compatible modems. The default is CRN. The CRI command is used if the phone number contains a semicolon (;) character followed by an identification code. For example:
AU 1-800-555-1212;123.

The following 3780Plus COnfig parameters must be set:

Line Type	=	Switched Line or Leased Line[1]
Modulation	=	(any)
Dialing Method	=	Synchronous or V.25bis

Supported V.25bis modems include:

- Codex 2264 (CCITT V.32)
- Racal-Vadic 9642PA (CCITT V.32 and Bell 208)
- UDS 9648T (CCITT V.29)

See **1.5.1 Automatic Dialing** in **Chapter 1 - Operation** for details on autodialing.

NOTES:

(1) The V.25bis dial string is sent out as synchronous, 7 bit, odd parity ASCII data;

(2) The modem must be configured to provide CTS when it is off line.

(3) 3780Plus uses the V.25bis standard < (less than) character to pause during dialing. This pause character may be changed (see **B.5 Video Display File** in **Appendix B - File Formats**).

[1] In general, Bell modems (except Bell 212) will require Switched Line settings and CCITT modems (except CCITT V.29) will require Leased Line settings.

A.3 External Non-Autodial Modems

3780Plus will function with modems that do not support the autodial methods previously described. These modems may establish a connection to the remote site in one of five ways:

- Leased line
- Autoanswer an incoming call (see **1.5.4 Automatic Answer** in **Chapter 1 - Operation** and **3.1 ANswer - Automatic Answer** in **Chapter 3 - 3780Plus Commands** for details)
- Manually dial with a phone handset (see **1.5.3 Manual Dialing** in **Chapter 1 - Operation** for details)
- Manually dial through the modem front panel (see **1.5.3 Manual Dialing** in **Chapter 1 - Operation** for details)
- DTR-controlled dial (see **1.5.2 DTR-Controlled Dialing** in **Chapter 1 - Operation** for details)

The following 3780Plus COnfig parameters must be set:

Line Type	=	Switched Line or Leased Line[1]
Modulation	=	(any)
Dialing Method	=	None

[1] In general, Bell modems (except Bell 212) will require Switched Line settings and CCITT modems (except CCITT V.29) will require Leased Line settings.

A.4 Modem Eliminators

For direct connection from 3780Plus to another local 3780 machine, a modem eliminator may be used to connect the two devices and provide clocking. A modem eliminator eliminates the need for two modems and a phone line when connecting two local machines.

The following 3780Plus COnfig parameters must be set:

Line Type	=	Switched Line
Modulation	=	(any)
Dialing Method	=	None

A modem eliminator usually contains a switch setting to control the communications speed. The selectable speeds may range from 1200 bps (or below) to 115,200 bps (or above). The speed should not be set over 56,000 bps or communications errors may result.

A modem eliminator normally has two 25 pin ports. 3780Plus will connect to one port; the other 3780 device will connect to the other port.

A.5 Null Modems

For direct connection between 3780Plus and another local 3780 device, a null modem cable may be used to connect the two devices. This eliminates the need for modems or a modem eliminator when connecting two local machines. With a null modem cable, however, one of the 3780 devices must provide clocking. Cleo's SYNCcable+ and PC/SIB may optionally provide clocking.

To provide clocking, the following 3780Plus COnfig parameters must be set:

Line Type	=	Switched Line
Modulation	=	speed required (except other)
Dialing Method	=	None

The 3780Plus -E command line option must be used to enable the clocking. The modulation parameter will then select the clock speed.

A null modem cable with the pinouts provided in the **Appendix C - Modem Interface Cables** in the *Installation* section may be used to connect SYNCcable+ or PC/SIB to another local machine running 3780.

Appendix B.
File Formats

3780Plus accesses and creates various files in the course of operation. This appendix contains information on the format of the following files:

- Configuration file
- Job/script file
- Log file
- Character translation files
- Video display file
- Monitor file
- Vertical forms file
- Baud rate definition file

B.1 Configuration File

3780Plus allows you to run with custom configuration files using the -C *configfile* option when executing 3780Plus or using the COnfig *configfile* command from within 3780Plus. You can create these custom configuration files using the COnfig command without a filename (see **3.6 COnfig - Display or Change Configuration** in **Chapter 3 - 3780Plus Commands**) or with a standard text editor. See **Chapter 2 - Configuration** for a description and a range for each parameter.

The following example shows the format for a configuration file:

80	transmission record size
4	repeat limit
4	retransmission limit
10	wait limit
100	delay limit
0	line type
1	terminal type
15	bid limit
0	idle limit in 30 second intervals
15	receive limit
1	space compression
1	transmission blocking factor
0	protocol type
	terminal id
0	RTS/CTS delay
1	modulation type
0	equalizer
0	new line suppression
0	dialing method

Note: The configuration file would not include the explanation to the right of each parameter.

B.2 Job/Script File

3780Plus allows you to run custom job files using the -J *jobfile* option when executing 3780Plus or using the EXecute *jobfile* command from within 3780Plus or from another job file. You can create custom job files for 3780Plus by using the JOb command (see **3.14 JOb - Create or Scramble a Job/Script File** in **Chapter 3 - 3780Plus Commands**) or a standard text editor.

The following example shows the format for a job file:

```
## JOB FILE 4/1/93
CONFIG CFGFILE                  change configuration
AUTODIAL 397-8110               dial remote site
BRANCH  ON  FAIL  TO 999        jump down to quit if no connection
KEY **SIGNON**                  send sign-on message
SCREEN                          receive sign-on response to screen
TEXT TXFILE.TXT                 transmit non-transparent text file
BINARY BIFILE.COM               transmit transparent binary file
RECEIVE RCVFILE                 receive file to disk
PRINT PRTFILE                   receive print file to disk
KEY **SIGNOFF**                 send sign-off message
SCREEN                          receive sign-off response to screen
VOICE                           hang-up phone line
999  QUIT                       exit 3780Plus
```

The first line in the above example is a comment line. Comment lines begin with the characters **##** and may be placed anywhere in a job file. The following lines contain 3780Plus commands. Each 3780Plus command must be on a separate line. Commands may be shortened to the first two characters, i.e. CONFIG CFGFILE and CO CFGFILE are identical to 3780Plus. Each command may be preceded by a command label. This label, a number from 1 to 9999, may be used to identify places in the job file for branching. See **Chapter 3 - 3780Plus Commands** and **Chapter 4 - 3780Plus Tutorial** for more job file examples.

Note: The job file would not include the explanations to the right of each command.

B.3 Log File

3780Plus has the ability to log all transactions and messages to the log file 3780.LOG. This default log file name may be changed (see **B.5 Video Display File** for details). The -LO, -LA, or -LN command line option allows you to select how the log file is used: -LO overwrites the existing log file; -LA appends to the existing log file; or -LN does not update the existing log file. See **1.2 Starting 3780Plus** in **Chapter 1 - Operation** for more details on the -L command line option.

The following example shows the format of the log file:

```
17:25:00  ********** 3780 LOGON **********  TUE JANUARY 25, 1993
17:25:03  Command> AUTODIAL  397-8110
                   DIAL: CONNECT_9600      :Connect Code=17
17:25:15  Command> KEY   /*SIGNON  JCL  INFO
17:25:17           TT: KEY                 :NRMEOF          :1 blocks
17:25:23  Command> TEXT  CLEO.EDI
17:27:50           TT: CLEO.EDI            :NRMEOF          :8 blocks
17:27:59  Command> KEY   /*SIGNOFF
17:28:01           TT: KEY                 :NRMEOF          :1 blocks
17:28:03  Command> VOICE
17:28:37  Command> QUIT
17:28:39  ********* 3780 LOGOFF *********  TUE JANUARY 25, 1993
```

The first and last lines contain the time and date of the start and finish of 3780Plus execution. The lines in between contain the time, commands executed, and status of the commands. The status lines are described in the following sections.

B.3.1 The Autodial/Answer/AT Status Line

After an autodial or answer command is completed, a status line is posted on the screen and in the log and monitor files (if open). The status line format is:

DIAL : *connect_msg* : Connect Code = *connect_code*

where:

connect_msg is the connection status of the last autodial or autoanswer (see Table B.1). Connection messages for AT command modems may be defined/changed in the video.ovr file. See **B.5 Video Display File** for details.

connect_code is the connection code returned by the attached AT command modem. This portion of the status line is not valid on a non-AT command modem.

For example, the following status line:

```
DIAL : CONNECT_9600  : Connect Code  =  18
```

would be posted after autodialing a CCITT V.32 AT command modem which connected at 9600 baud.

Table B.1 lists AUtodial/ANswer connection messages along with a brief explanation of each.

Connect Message	Connect Code	Explanation
BUSY	7	Remote line is busy
CONNECT	1	Connection complete
CONNECT_1200	5	Connection complete at 1200 bps
CONNECT_2400	10	Connection complete at 2400 bps
CONNECT_4800	11	Connection complete at 4800 bps
CONNECT_9600	12,18	Connection complete at 9600 bps
CONNECT_14400	13	Connection complete at 14,400 bps
CONNECT_19200	14	Connection complete at 19,200 bps
CONNECT_201	16	Connection complete with Bell 201
CONNECT_208	17	Connection complete with Bell 208
DIAL_ABORT	9	AUtodial/ANswer aborted by user
ERROR	4	Error in autodial string
NO_ANSWER	8	Modem did not detect 5 seconds of silence
NO_CARRIER	3	Connection incomplete
NO_DIAL_TONE	6	Modem did not detect dial tone
RING	2	Line rang but did not connect (answer only)
OK*	0,1,5,10+	Connection complete
FAIL*	2,3,4,6,7,8,9	Dial/answer ended with no connection

* These messages will not be displayed, but may be used to branch.

TABLE B.1 AUTODIAL/ANSWER COMPLETION STATUS MESSAGES

B.3.2 The Transmit/Receive Status Line

After each file transmission or reception, a status line will be posted on the screen and in the log and monitor files (if open). The status line format is:

mode : *filename* : *status* : *blkcnt* blocks

where:

mode TT is for transmit text or binary file with translation
TB is for transmit binary file with no translation
TN is for transmit text file with no translation
TX is for transmit binary file with translation
RT is for receive text file with translation
RB is for receive binary file with no translation
RN is for receive text file with no translation
RX is for receive binary file with translation
PT is for receive text print file with translation
PB is for receive binary print file with no translation
PN is for receive text print file with no translation
PX is for receive binary print file with translation
T is for transmit EOT

filename is the name of the file transmitted or received
KEY is for keyboard messages
EOT is for End of Transmission
(to Screen) is for files received to screen

status is the receive or transmit completion status message (see Tables B.2 and B.3)

blkcnt is number of data blocks sent or received

For example, the following status line:

TT : LETTER.TXT : NRMEOF : 20 blocks

would be posted after the TExt command transmits the file LETTER.TXT without errors in 20 blocks of data.

Tables B.2 and B.3 list the receive and transmit status messages along with a brief explanation of the each. A more detailed description of each message follows.

Status Message	Explanation
ABORT	Keyboard-forced abort before receive (in job file)
BUFOVF	Buffer overflow
DELAY	Delay limit expired
DSKERR	Write to disk failed
EAREOF	Early end of file
EOTND	No data received before EOT
HANGUP	Remote machine hung up line
IDLE	Idle limit expired
INTEOF	Keyboard-forced abort (Interrupt End Of File)
LINDWN	System line down
NODATA	No incoming data
NRMEOF	Normal end of file
RECEIV	Receive limit expired
RETRAN	Retransmission limit expired

TABLE B.2 RECEIVE COMPLETION STATUS MESSAGES

Status Message	Explanation
ABORT	Keyboard-forced abort
BIDLMT	Bid limit expired
CONTEN	Line bid contention
HANGUP	Remote machine hung up line
IDLE	Idle limit expired
INTRPT	Interrupt end of file
LINDWN	System line down
NOFILE	Unable to open file
NRMEOF	Normal end of file
REPEAT	Repeat limit expired
RETRAN	Retransmission limit expired
RMTABT	Remote terminal aborted transmission
TXABRT	Transmit failure aborted
WAIT	Wait limit expired

TABLE B.3 TRANSMIT COMPLETION STATUS MESSAGES

B.3.3 Status Messages

Status messages may be viewed or acted upon by the BRanch command to control job execution. Table B.4 lists the status messages returned for each 3780Plus command along with a brief explanation of the each. The transmit and receive status messages are described in more detail below.

Command	Status	Explanation
ANswer	OK*	Connection complete
	FAIL*	No incoming calls
	DIAL_ABORT	ANswer aborted by user
	Various	See Table B.1
APi	Return_code	Return code from the application program
AT	OK*	Command complete
	FAIL*	Command failed
	DIAL_ABORT	Command aborted by user
	Various	See Table B.1
AUtodial	OK*	Connection complete
	FAIL*	Dial retries expired with no connection
	DIAL_ABORT	AUtodial aborted by user
	Various	See Table B.1
BInary	Various	See Table B.3
BRanch	None	Does not change current status value
COnfig	OK*	Configuration loaded
	FAIL*	Error in configuration
	NOFILE*	Unable to open file
+COUNTER	None	Does not change current status value
-COUNTER	None	Does not change current status value
DAta	None	Does not change current status value
EOt	None	Does not change current status value
EXecute	None	Does not change current status value
HElp	None	Does not change current status value
INterrupt	Various	See Table B.2
JOb	None	Does not change current status value

* Status will not be displayed, but may be used for BRanching.

TABLE B.4 3780Plus COMMAND STATUS MESSAGES (Part 1 of 2)

Command	Status	Explanation
KEy	Various	See Table B.3
LOg	None	Does not change current status value
MOnitor	None	Does not change current status value.
PRint	Various	See Table B.2
QUit	None	Unconditional exit from 3780Plus
REceive	Various	See Table B.2
SCreen	Various	See Table B.2
SLeep	OK* ABORT* FAIL*	Pause time complete SLeep aborted by user Error in command
STart	None	Does not change current status value
SYstem	Exit_code	Exit code from the operating system, command, or program
TAble	OK* FAIL* NOFILE*	Translation table(s) loaded Error in table(s) Unable to open file(s)
TExt	Various	See Table B.3
TOken	None	Does not change current status value
VOice	None	Does not change current status value
##	None	Does not change current status value

* Status will not be displayed, but may be used for BRanching.

TABLE B.4 3780Plus COMMAND STATUS MESSAGES (Part 2 of 2)

Each of the transmit and receive status messages is described below along with suggested corrective actions.

ABORT The **ABORT** status is generated in the receive (REceive, PRint, INterrupt, or SCreen) mode by hitting the **DELETE** key before 3780Plus has received a bid (ENQ). It is generated in the transmit (TExt, BInary, or KEy) mode by hitting the **DELETE** key at any time during the transmission process.

Note, hitting the **DELETE** key while receiving a file causes an **INTEOF** status.

BIDLMT The **BIDLMT** status is generated by the expiration of the BID LIMIT parameter set by the COnfiguration command. If there is no response to an initial line bid (ENQ) after 1 second (or 3 seconds if LINE TYPE is secondary), a BID timeout occurs. When the number of consecutive BID timeouts exceeds the BID LIMIT parameter, the **BIDLMT** status is returned.

Corrective Action:

The BID LIMIT may be set to a higher value using the COnfiguration command. If the **BIDLMT** status still occurs, check the following:

- the modem types and baud rates are the same for the local and remote computers;
- you have an active telephone connection (on 3780Plus implementations that do not support line down detection);
- both sides are not trying to send at the same time (look at the MOnitor file);
- there is no address or interrupt conflict on internal board versions;
- the modem's RTS-to-CTS delay is set to 150ms for long distance 201 or 208 connections;
- the remote computer appears to be receiving the line bids (ENQ).

BUFOVF The **BUFOVF** status is posted when the incoming data is too large to fit in the communications buffer. 3780Plus will accept a maximum block size of 4048 characters.

Corrective Action:

Have the remote send fewer characters per block.

CONTEN The **CONTEN** status indicates that the remote site is bidding for the line at the same time 3780Plus is bidding for the line. In other words, both computers are trying to transmit at the same time. This status occurs only when 3780Plus is configured as a secondary terminal, i.e. the COnfiguration TERMINAL TYPE = secondary.

Corrective Action:

Use a receive command (REceive, PRint, or SCreen) to receive before sending.

DELAY The **DELAY** status indicates that the DELAY LIMIT configuration parameter has been exceeded. A delay is the reception of a Temporary Text Delay (TTD) sequence from the remote computer. A TTD is the reception of a ENQ STX (3780) or ENQ IUS (2780).

Corrective Action:

Set the DELAY LIMIT parameter to a higher number using the COnfiguration command. TTDs indicate that the remote computer is holding the line open. The remote computer may be busy and holding the line by sending TTDs in order to queue up more data to send.

DIAL_ABORT The **DIAL_ABORT** status is generated during the AUtodial, ANswer, or AT command by hitting the **DELETE** key.

DSKERR The **DSKERR** status indicates a write to disk failure. **DSKERR** may also occur when the specified file exists and is write protected.

Corrective Action:

3780Plus attempts to write to the disk multiple times when an error is detected to insure against inaccurate or transient error returns. **DSKERR** may occur when the disk is full. If there seems to be enough space and you get this message, examine your disk for problems.

EAREOF The **EAREOF** status is generated when an End of Transmission (EOT) character was received before 3780Plus completely received the file. A file is considered to be complete upon reception of an End of Text (ETX) character.

Corrective Action:

If this error occurs frequently, save a monitor file to disk so you can look at the protocol (See MOnitor command).

This status may indicate line problems if the EOT appears to be received in error. A "correct" EOT appears in the monitor file as:

<SY SY ET or <ET

An EOT appearing in a received block at the end of a string of characters indicates unstable line conditions. This situation occurs most frequently on noisy phone lines when receiving a non-transparent (text) file.

Some hosts do not send an ETX at the end of data, so the file you received may, in fact, be complete.

EOTND The **EOTND** status is generated by the following protocol sequence:

```
<SY SY EQ                    <- Remote Computer
>SY SY DL A0 PD PD
<SY SY ET                    <- Remote Computer
```

In the above sequence, no data is received even though the remote computer requested the line. The final End of Transmission (EOT) indicates that the line is available to either side.

Corrective Action:

There is no way to avoid this status. Some hosts send this sequence to hold the line open while they queue up data to send. If you suspect this is the case, you can follow your receive command with a BRANCH ON EOTND TO *label* command to receive again.

HANGUP The **HANGUP** status is posted when a DLE EOT sequence is received during the transmission or reception of data. This indicates that the remote computer will be hanging up the phone line.

Corrective Action:

If you think the communication session is incomplete, contact the host site to find out why they disconnected.

IDLE The **IDLE** status is posted when the IDLE LIMIT configuration parameter has expired. The IDLE LIMIT parameter is used to hang up the communications line after no communications activity has occurred for the specified period of time.

Corrective Action:

You control the time period for this parameter. If the IDLE message occurs earlier than you expect, you may wish to set the IDLE LIMIT value higher or to disable the IDLE LIMIT altogether by setting the value to 0 with the COnfiguration command.

INTEOF The **INTEOF** status results from hitting the **DELETE** key during the reception of a file. Pressing the **DELETE** key causes a Reverse Interrupt (RVI) to be sent to the remote computer. The remote computer should respond with an End Of Transmission (EOT) causing the **INTEOF** status.

The **INTEOF** status can also be generated by using the INterrupt command.

INTRPT The **INTRPT** status is generated when a Reverse Interrupt (RVI) is received during transmission of a file. An RVI indicates that the remote computer wants control of the line to send something. Note: Receiving an RVI in response to the last block of data will post an **NRMEOF** status.

Corrective Action:

If the RVI is unexpected, use the SCreen or REceive command to receive the file from the host. This file may contain a description of the error encountered. If it does not, contact your host.

LINDWN The **LINDWN** status is generated when 3780Plus senses that the communications line has gone down. On an external modem, if the COnfiguration Line Type is set to Switched Line, a low Data Set Ready (DSR) pin will cause a **LINDWN** status; if the COnfiguration Line Type is set to Leased Line, a low Carrier Detect (CD) pin will cause a **LINDWN** status. Note: Not all 3780Plus hardware is able to determine the state of the DSR and CD pins.

Corrective Action:

If the **LINDWN** status is received during or immediately following the transmission of a signon file, check the format of your file. Signon files generally need to be in capital letters, spaced correctly, and padded with spaces to 80 characters. If you are running in interactive mode, try creating a job file; most hosts have a short receive timeout period before disconnecting. If these measures fail, contact your host for more information.

NODATA The **NODATA** status is posted when the RECEIVE LIMIT configuration parameter has expired. A RECEIVE timeout occurs when 3780Plus waits 4 seconds and does not get a bid (ENQ) from the remote computer. When the number of consecutive RECEIVE timeouts exceeds the RECEIVE LIMIT parameter, the **NODATA** status is returned.

Corrective Action:

The RECEIVE LIMIT may be set to a higher value using the COnfiguration command. Verify that the remote will be transmitting at this point.

NOFILE The **NOFILE** status is posted when the file to be sent cannot be found or opened.

Corrective Action:

Specify the complete path name for the file you wish to send. Make sure you have the correct privileges or authority to access the file.

NRMEOF The **NRMEOF** status is posted for a Normal End of File condition. This means that the data was received or transmitted in good form within the protocol.

RECEIV The **RECEIV** status is posted when the RECEIVE LIMIT configuration parameter has expired. A RECEIVE timeout occurs when 3780Plus waits 4 seconds and receives no information from the remote computer. When the number of consecutive RECEIVE timeouts exceeds the RECEIVE LIMIT parameter, the **RECEIV** status is returned.

Note that this condition is very similar to the **NODATA** status except that the **RECEIV** condition will only occur after the remote computer has sent at least one initial line bid (ENQ).

Corrective Action:

The RECEIVE LIMIT may be set to a higher value using the COnfiguration command. If this status occurs frequently after receiving a varying number of blocks, check your phone line for excessive noise.

REPEAT The **REPEAT** status is generated by the expiration of the REPEAT LIMIT configuration parameter. If there is no response to a line bid (ENQ) after 4 seconds, a REPEAT timeout occurs. When the number of consecutive REPEAT timeouts exceeds the REPEAT LIMIT parameter, the **REPEAT** status is returned.

Note that this condition is very similar to the **BIDLMT** status except that the REPEAT condition will only occur after the remote computer has responded to at least one initial line bid (ENQ).

Corrective Action:

The REPEAT LIMIT may be set to a higher value using the COnfiguration command. If the **REPEAT** message re-occurs, make sure that you have an active telephone connection on those versions of 3780Plus which do not support line down detection.

RETRAN The **RETRAN** status is posted by the expiration of the RETRANSMISSION LIMIT configuration parameter. The RETRANSMISSION LIMIT is the number of consecutive times that a Negative Acknowledge (NAK) may be sent or received before this limit is exceeded. A NAK means that the last block was not received correctly. A NAK causes the last block to be resent.

Corrective Action:

The RETRANSMISSION LIMIT may be set to a higher value using the COnfig command. For transmissions, reduce the COnfig TRANSMISSION RECORD SIZE and BLOCKING FACTOR; smaller blocks have a better chance of transmitting on a noisy phone line. If the RETRANSMISSION LIMIT is set reasonably high (greater than 20) and the RETRAN message still appears, check your phone line for excessive noise.

RMTABT The **RMTABT** status is generated when an End Of Transmission (EOT) character is received during the transmission of a file. In general this would indicate something is wrong on the remote computer as it is attempting to gain control of the line. The remote may be expecting to send a file, not receive one.

Corrective Action:

If this status re-occurs, contact your host site to find out why the host is sending the EOT at an unexpected time.

TXABRT The **TXABRT** status results from an unrecoverable hardware condition where data cannot physically be transmitted to the remote computer.

Corrective Action:

This status should rarely occur. If it persists, call the CLEO technical support line.

WAIT

The **WAIT** status is caused by the expiration of the WAIT LIMIT configuration parameter. A WAIT timeout is caused by receiving a Wait ACKnowledge (WACK) message from the remote computer. When the number of consecutive WACKs exceeds the WAIT LIMIT, the **WAIT** status is posted.

A wait acknowledge means that the remote system received the last block correctly but needs more time to free up buffers, etc. Receiving a WACK causes 3780Plus to wait and re-bid (ENQ) the line. When the appropriate ACK is received, the transmission resumes.

Corrective Action:

The WAIT LIMIT value may be increased using the COnfiguration command. If the condition persists, find out what is causing the sending of WACKs.

B.4 Character Translation Files

Translation file(s) are used by 3780Plus for ASCII to EBCDIC (outgoing) and EBCDIC to ASCII (incoming) character translations. The TAble command may be used from within 3780Plus to view the current translations. By default a single translation table (asciiebc.ovr) is used for both outgoing and incoming character translations. To use separate translation files for outgoing and incoming character translations, see **B.4.2 EBCDIC to ASCII Translation Table**.

You may modify the default file(s) or create your own translation file(s) with an ordinary text editor. The original asciiebc.ovr and/or ebcascii.ovr files should be saved under a different name before making any modifications.

B.4.1 ASCII to EBCDIC Translation File

The asciiebc.ovr file is used by 3780Plus for ASCII to EBCDIC (outgoing) and EBCDIC to ASCII (incoming) character translations. The TAble *filename* command may be used to load a new ASCII/EBCDIC translation file (see **3.25 TAble - Display or Change Translation Table(s)** in **Chapter 3 - 3780Plus Commands**). The following example shows the format for the ASCII to EBCDIC translation file:

```
# English (US)
4 0x37
5 0x2d
6 0x2e
  :
127 0x07
155 0x4a cent sign
179 0x4f
```

The first line in this default asciiebc.ovr file is a comment line. Comment lines begin with the # character and may be placed anywhere in the translation file. The following lines contain character translations. The first number in each line represents the ASCII character in decimal and the second number represents the corresponding EBCDIC character in hexadecimal. All characters after the EBCDIC character and before the newline character are ignored by 3780Plus. Comments may be displayed here (note the "cent sign" following the EBCDIC translation of 155).

Special protocol translations:

- An incoming record separator (RS or US) is normally translated to characters carriage return and line feed (CR/LF) or, on UNIX/XENIX REceives, to new line (NL). To translate RS and US to LF, modify the 13 0x0d translations in the asciiebc.ovr file. To translate RS and US to a different character, modify the 30 0x1e (RS) and 31 0x1f (US) translations in the asciiebc.ovr file.

- An incoming new line (NL) character is normally translated to the CR/LF characters. To translate NL to a different character, modify the 21 0x15 translation. Note: NL may not be passed through as-is.

- An incoming pad (FF) character is normally dropped. To translate FF, add a 0xff translation (i.e. 255 0xff).

B.4.2 EBCDIC to ASCII Translation File

If separate translation files are specified, the asciiebc.ovr file will control only outgoing character (ASCII to EBCDIC) translations; the ebcascii.ovr file will control all incoming character (EBCDIC to ASCII) translations. Message #151 of the video.ovr file (see **B.5 Video Display File** for details) or the TAble *outfile infile* command may be used to enable separate outgoing and incoming translation files.

The following example shows the format for the EBCDIC to ASCII translation file:

```
# English (US)
0x05  9
0x07  127
0x0b  11
0x0c  12
  :
0x1e  13,10   RS
  :
0xf8  56
0xf9  57
0xff  *     remove
```

The first line in this default ebcascii.ovr file is a comment line. Comment lines begin with the # character and may be placed anywhere in the translation file. The following lines contain character translations. The first number in each line represents the EBCDIC character in hexadecimal and the second number represents the corresponding ASCII character in decimal. EBCDIC characters may be converted to two ASCII characters (note the "0x1e 13,10" line which converts an incoming record separator to carriage return & line feed characters). EBCDIC characters may also be removed with the * character (note the "0xff *" line which drops the pad (FF) character).

See Tables B.6 and B.7 for standard ASCII to EBCDIC, EBCDIC to ASCII, and hexadecimal to decimal conversions.

Use care in modifying translation tables. 3780Plus may not work properly if 2780/3780 protocol characters are translated incorrectly.

DOS versions of 3780Plus include 19 ASCII to EBCDIC translation tables for various foreign languages. These files are AEPC.1 through AEPC.19. The language is specified on the top line of the file. The selected AEPC.# file may be copied into the asciiebc.ovr file.

NOTE: The default asciiebc.ovr (ASCII to EBCDIC) translation file and/or ebcascii.ovr (EBCDIC to ASCII) translation file names may be changed (see **B.5 Video Display File** for details).

B.5 Video Display File

The video.ovr file is used by 3780Plus for screen message display, default file names, modem initialization strings, and dial result strings. To customize these parameters, the video.ovr file may be modified with a standard text editor.

B.5.1 Screen Formatting Information

The default video.ovr file does not use screen formatting information. Some versions of 3780Plus include a video.ans file. The video.ans file uses ansi escape sequences for simple screen formatting. To use the ansi compatible overlay file, the original video.ovr should be saved under a different name, and video.ans copied to video.ovr.

To enable the ansi driver on a DOS system, insert the following statement into the CONFIG.SYS file:

DEVICE=ANSI.SYS

If the CONFIG.SYS file does not exist on your DOS system, it must be created. Reference your DOS Operating System Manual for instructions. After the CONFIG.SYS file has been created or modified, reboot your DOS system; this will incorporate the change.

B.5.2 3780Plus Messages

Many 3780Plus messages are stored in the video.ovr file to allow for language translation. The general format for these messages is:

```
#xx  ^B message ^C
```

The maximum size for any individual message is 2000 characters. One line error messages should be limited to 80 characters. Do not delete messages. Do not delete the ^B or ^C characters.

B.5.3 3780Plus File Names

Default file names are stored in the video.ovr file. These are:

```
#125 ^B3780.LOG^C                <= log file
#126 ^BRCVFILE^C                 <= receive-to-disk file
#127 ^BPRINT^C                   <= receive print file
#128 ^Basciiebc.ovr^C            <= ASCII <=> EBCDIC conversion table
#129 ^Bsc3780^C                  <= download code for SYNCcable+
:
#139 ^B3780.pid^C                <= IAPI PID file
:
#144 ^B3780.con^C                <= hardware configuration file
:
#148 ^Bchannel.ovr^C             <= vertical forms control file
:
#151 ^B^C ebcascii.ovr           <= EBCDIC => ASCII conversion table
#152 ^Bdefault.cfg^C             <= default configuration file
:
#156 ^Bbaud.ovr^C                <= default baud rate definition file
```

Note: The video file would not include the explanation to the right of each message.

These file names are read in on startup. You may change these file names and/or add a drive or path prefix. The modified file names (including paths) must be less than 64 characters in length. Environment variables may be used to specify these file names.

Note: The standard EBCDIC to ASCII conversion file name is listed after the ^B^C sequence in message #151; to enable this separate EBCDIC to ASCII conversion table, the file name must be inserted between the ^B and ^C. Note: To disable a default configuration file, you must remove the filename between the ^B and ^C in message #152.

B.5.4 Modem Setup Strings

Default modem setup strings used by the AUtodial and ANswer commands are stored in messages #131 and #132. These lines are:

```
#131 ^BO2311221112^C                <= synchronous modem setup
#132 ^B^C AT S8=5&C1&D1M1&M1        <= AT modem setup
```

These setup strings are read in on startup. You may change these strings as needed. The modified string must be less than 64 characters in length. Note: The default Hayes AT modem setup string is listed after the ^B^C sequence. To modify this string, a new string must be inserted between the ^B and ^C.

The default CCITT V.25bis pause character used by the AUtodial command is stored in message #147. This character may be modified if needed:

```
#147 ^B<^C                          <= V.25bis pause character
```

B.5.5 Modem Result Messages

Default modem result codes and messages used by the AUtodial and ANswer commands are stored in message #150. These codes and messages are:

```
#150 ^B0=OK
1=CONNECT
2=RING
3=NO_CARRIER
4=ERROR
5=CONNECT_1200
6=NO_DIAL_TONE
7=BUSY
8=NO_ANSWER
9=ABORT
10=CONNECT_2400
11=CONNECT_4800
12=CONNECT_9600
13=CONNECT_14400
14=CONNECT_19200
16=CONNECT_201
17=CONNECT_208
18=CONNECT_9600
32=CONNECT_9600
^C
```

Result codes 0 through 12 and their corresponding messages are defined for a standard V.32 modem which supports AT command dialing. These messages, and additional non-standard messages, may be modified or appended as needed for your modem. The modified string must be less than 255 characters in length.

B.6 Monitor File

The MOnitor *filename* command may be used to save all protocol characters and data to a file. See **3.17 MOnitor - Open or Close a Serial Line Monitor** in **Chapter 3 - 3780Plus Commands** for details on executing the monitor command. This monitor file is helpful in determining communication problems. If necessary, a printout of this file may be mailed or faxed to Cleo's Technical Support department.

For more information on 2780/3780 protocol, the references noted in the **Related Documentation** portion of the **Before You Begin** section are recommended.

B.6.1 Using the Monitor

The 3780Plus MOnitor command invokes a built-in serial line monitor to display or save the actual received and transmitted bisync protocol characters. This serial line monitor is useful for determining communication problems. The monitor, however, should only be invoked to determine the cause of communications problems because it slows communications and consumes a lot of disk space.

If you encounter a status error message, check **B.3.3 Status Messages** for possible actions before using the monitor. If you are getting a **NRMEOF** status but are receiving or transmitting data that you think should be different, use the monitor command to determine exactly what is being sent and received. For transmit problems, for instance, use the MOnitor command before the transmit command to save the monitor to a file and once again after the transmit command to turn the monitor off. For example:

```
MONITOR SIGNON.MON
TEXT SIGNON
MONITOR
```

This will create a monitor file with the name SIGNON.MON. This monitor file may be display to the screen with the DOS command "TYPE SIGNON.MON" or UNIX command "cat SIGNON.MON", or it may be viewed with a text editor or printed. If necessary, a printout of this file may be mailed or faxed to CLEO's Technical Support department.

B.6.2 Sample Monitor

The monitor displays the characters in a combination of abbreviated protocol characters and hexadecimal characters. During AT Command setup, dialing, and disconnecting, the monitor displays the asynchronous data as ASCII characters (Note: The CR character is not displayed). Data transmitted by 3780Plus starts with the ">" (greater than) character. Data received by 3780Plus starts with the "<" (less than) character. Example:

```
> SY SY SY EQ PD PD PD
< SY DL A0
> SY SY SY SX F1 F2 F3 F4 F5 F6 F7 F8 F9 F0 RS EB 20 43 FF FF FF
< SY DL A1
> SY SY SY SX 81 82 83 84 85 86 87 88 89 91 92 93 94 95 96 97 98 99 A2
  A3 A4 A5 A6 A7 A8 A9 RS EX 83 EB FF FF FF
< SY DL A0

TT  : 123abc            : NRMEOF    :  2 blocks

> SY SY SY ET PD PD PD
```

A line-by-line description of the above example follows:

Line 1 — 3780Plus sent (>) three synchronization characters (SY SY SY), a line bid (EQ), and three pad characters (PD PD PD). The line bid is sent to get the remote system's attention. Each block must begin with a minimum of two synchronization (sync) characters and end with a minimum of one pad characters. See Table B.5 for a list of protocol characters.

Line 2 — The remote site sent (<) one sync character (SY), and a positive acknowledgment (DL A0). This positive acknowledgment means that the remote received the 3780Plus bid and is ready to receive. Note: This implementation of 3780Plus removes all but one incoming sync character and all the trailing pad characters.

Line 3 — 3780Plus sent (>) three sync characters (SY SY SY), a start of text character (SX), data (F1 F2 F3 F4 F5 F6 F7 F8 F9 F0), a record separator (RS), an end of block character (EB), two error check characters (20 43), and three pad characters (FF FF FF). The SX start of text character indicates non-transparent (text) data will follow; the characters DL SX would indicate transparent (binary) data would follow. The data (1234567890) is transmitted in EBCDIC form and displayed in hexadecimal (see Table B.7 for EBCDIC translations). The record separator replaces the new line character (CR/LF in DOS or NL in UNIX) which was in the file 123abc. The EB end of block character indicates the end of this non-transparent (text) block of data; the hexadecimal characters 10 26 would indicate the end of a transparent (binary) block of data. The error check characters follow; these characters are compared at the remote end for errors.

Line 4 — The remote site sent (<) one sync character (SY) and a positive acknowledgment (DL A1). This positive acknowledgment means that the remote received the block correctly. Note: This acknowledgment is different from the acknowledgment to the line bid. Line bids and even blocks receive even acknowledgments (A0); odd blocks receive odd acknowledgments (A1).

Lines 5 & 6 — 3780Plus sent (>) three sync characters (SY SY SY), a start of text character (SX), data (81 82 83 84 85 86 87 88 89 91 92 93 94 95 96 97 98 99 A2 A3 A4 A5 A6 A7 A8 A9), a record separator (RS), an end of text character (EX), two error check characters (83 EB), and three pad characters (FF FF FF). This block is similar to Line 3 except for the data (abcdefghijklmnopqrstuvwxyz) and the EX end of text character which replaces the EB end of block character indicating the end of this file; the hexadecimal characters 10 03 would indicate the end of a transparent (binary) file.

Line 7 — The remote site sent (<) one sync character (SY) and a positive acknowledgment (DL A0). This positive acknowledgment means that the remote received the second block correctly.

Line 8 — 3780Plus posts a status line message to indicate the outcome of the command: 3780Plus transmitted the text (TT) file 123abc (123abc) normally (NRMEOF) in 2 blocks (2 blocks).

Line 9 — 3780Plus sent (>) three sync characters (SY SY SY), an end of transmission character (ET), and three pad characters (FF FF FF). The end of transmission indicates that 3780Plus is finished sending and the line is released to allow the remote system to transmit.

Table B.5 lists the hexadecimal values and the 3780Plus abbreviated symbolic forms of 2780/3780 protocol characters. Tables B.6 and B.7 list the standard U.S. ASCII to EBCDIC and EBCDIC to ASCII translations for the data.

Protocol Character	EBCDIC (Hex)	3780 Plus	Function
SYNC	32	SY	Synchronization character
ENQ	2D	EQ	Enquiry - line bid or response request
PAD	FF	PD	Trailing pad - establishes turnaround time
DLE	10	DL	Data link escape - delimiter for transparent mode
ACK0	70	A0	Positive acknowledge to even block or line bid
ACK1	61	A1	Positive acknowledge to odd block
NAK	3D	NK	Negative acknowledge - block or line bid rejected
WACK	6B	WK	Wait acknowledge - replaces ACK when receiver needs more time for processing
RVI	7C	RV	Reverse interrupt - replaces ACK when receiver wants control of line; transmitter responds with EOT
TTD	02 2D	SX EQ	Temporary text delay - transmitter needs more time for processing; receiver responds with NAK
STX	02	SX	Start of text - begin block & clear block check character
ETB	26	EB	End of block - 2 block check characters follow
ETX	03	EX	End of text - 2 block check characters follow
EOT	37	ET	End of transmission
BEL	2F	BL	Turn on receiver's audible alarm
IGS	1D	GS	Space compression - a number indicating the number of spaces removed follows
IRS	1E	RS	Record separator (3780)
IUS	1F	US	Record separator (2780) - 2 block check characters follow

TABLE B.5 PROTOCOL CHARACTERS

GRAPHIC	ASCII hex/dec	EBCDIC hex/dec	GRAPHIC	ASCII hex/dec	EBCDIC hex/dec
NUL	00/00	00/00	SP	20/32	40/64
SOH	01/01	01/01	!	21/33	5A/90*
STX	02/02	02/02	"	22/34	7F/127*
ETX	03/03	03/03	#	23/35	7B/123*
EOT	04/04	37/55	$	24/36	5B/91*
ENQ	05/05	2D/45	%	25/37	6C/108
ACK	06/06	2E/46	&	26/38	50/80
BELL	07/07	2F/47	'	27/39	7D/125
BS	08/08	16/22	(	28/40	4D/77
HT	09/09	05/05	)	29/41	5D/93
LF	0A/10	25/37	*	2A/42	5C/E0
VT	0B/11	0B/11	+	2B/43	4E/78
FF	0C/12	0C/12	WACK or ,	2C/44	6B/107
CR	0D/13	0D/13	-	2D/45	60/96
SO	0E/14	0E/14	.	2E/46	4B/75
SI	0F/15	0F/15	ACK1 or /	2F/47	61/97
DLE	10/16	10/16	0	30/48	F0/240
DC1 or XON	11/17	11/17	1	31/49	F1/241
DC2	12/18	12/18	2	32/50	F2/242
DC3 or XOFF	13/19	13/19	3	33/51	F3/243
DC4	14/20	3C/60	4	34/52	F4/244
NL	15/21	15/21	5	35/53	F5/245
SYN	16/22	32/50	6	36/54	F6/246
ETB	17/23	26/38	7	37/55	F7/247
CAN	18/24	18/24	8	38/56	F8/248
EM	19/25	19/25	9	39/57	F9/249
SUB	1A/26	3F/62	:	3A/58	7A/122
ESC	1B/27	27/39	;	3B/59	5E/94
FS	1C/28	1C/28	<	3C/60	4C/76
GS	1D/29	1D/29	=	3D/61	7E/126
RS	1E/30	1E/30	>	3E/62	6E/110
IUS	1F/31	1F/31	?	3F/63	6F/111

* Dependent upon language.

TABLE B.6 ASCII to EBCDIC TRANSLATION (Part 1 of 2)

GRAPHIC	ASCII hex/dec	EBCDIC hex/dec	GRAPHIC	ASCII hex/dec	EBCDIC hex/dec
RVI or @	40/64	7C/124*	`	60/96	79/121*
A	41/65	C1/193	a	61/97	81/129
B	42/66	C2/194	b	62/98	82/130
C	43/67	C3/195	c	63/99	83/131
D	44/68	C4/196	d	64/100	84/132
E	45/69	C5/197	e	65/101	85/133
F	46/70	C6/198	f	66/102	86/134
G	47/71	C7/199	g	67/103	87/135
H	48/72	C8/200	h	68/104	88/136
I	49/73	C9/201	i	69/105	89/137
J	4A/74	D1/209	j	6A/106	91/145
K	4B/75	D2/210	k	6B/107	92/146
L	4C/76	D3/211	l	6C/108	93/147
M	4D/77	D4/212	m	6D/109	94/148
N	4E/78	D5/213	n	6E/110	95/149
O	4F/79	D6/214	o	6F/111	96/150
P	50/80	D7/215	p	70/112	97/151
Q	51/81	D8/216	q	71/113	98/152
R	52/82	D9/217	r	72/114	99/153
S	53/83	E2/226	s	73/115	A2/162
T	54/84	E3/227	t	74/116	A3/163
U	55/85	E4/228	u	75/117	A4/164
V	56/86	E5/229	v	76/118	A5/165
W	57/87	E6/230	w	77/119	A6/166
X	58/88	E7/231	x	78/120	A7/167
Y	59/89	E8/232	y	79/121	A8/168
Z	5A/90	E9/233	z	7A/122	A9/169
[	5B/91	AD/173	{	7B/123	C0/192*
\	5C/92	E0/224*	|	7C/124	6A/106*
]	5D/93	BD/189	}	7D/125	D0/208*
^	5E/94	5F/95*	~	7E/126	A1/161*
_	5F/95	6D/109	DEL	7F/127	07/07

* Dependent upon language.

TABLE B.6 ASCII to EBCDIC TRANSLATION (Part 2 of 2)

GRAPHIC	EBCDIC hex/dec	ASCII hex/dec	GRAPHIC	EBCDIC hex/dec	ASCII hex/dec
NUL	00/00	00/00		20/32	
SOH	01/01	01/01		21/33	
STX	02/02	02/02		22/34	
ETX	03/03	03/03		23/35	
	04/04			24/36	
HT	05/05	09/09	LF	25/37	0A/10
	06/06		ETB	26/38	17/23
DEL	07/07	7F/127	ESC	27/39	1B/27
	08/08			28/40	
	09/09			29/41	
	0A/10			2A/42	
VT	0B/11	0B/11		2B/43	
FF	0C/12	0C/12		2C/44	
CR	0D/13	0D/13	ENQ	2D/45	05/05
SO	0E/14	0E/14	ACK	2E/46	06/06
SI	0F/15	0F/15	BELL	2F/47	07/07
DLE	10/16	10/16		30/48	
DC1 or XON	11/17	11/17		31/49	
DC2	12/18	12/18	SYN	32/50	16/22
DC3 or XOFF	13/19	13/19		33/51	
	14/20			34/52	
NL	15/21	15/21		35/53	
BS	16/22	08/08		36/54	
	17/23		EOT	37/55	04/04
CAN	18/24	18/24		38/56	
EM	19/25	19/25		39/57	
	1A/26			3A/58	
	1B/27			3B/59	
FS	1C/28	1C/28	DC4	3C/60	14/20
IGS	1D/29	1D/29	NAK	3D/61	
IRS	1E/30	1E/30		3E/62	
IUS	1F/31	1F/31	SUB	3F/63	1A/26

* Dependent upon language.

TABLE B.7 EBCDIC to ASCII TRANSLATION (Part 1 of 4)

GRAPHIC	EBCDIC hex/dec	ASCII hex/dec	GRAPHIC	EBCDIC hex/dec	ASCII hex/dec
SP	40/64	20/32	-	60/96	2D/45
	41/65		ACK1 or /	61/97	2F/47
	42/66			62/98	
	43/67			63/99	
	44/68			64/100	
	45/69			65/101	
	46/70			66/102	
	47/71			67/103	
	48/72			68/104	
	49/73			69/105	
cent	4A/74*	9B/155	|	6A/106*	7C/124
.	4B/75	2E/46	WACK or ,	6B/107	2C/44
<	4C/76	3C/60	%	6C/108	25/37
(	4D/77	28/40	_	6D/109	5F/95
+	4E/78	2B/43	>	6E/110	3E/62
|	4F/79*	B3/179	?	6F/111	3F/63
&	50/80	26/38	ACK0	70/112	
	51/81			71/113	
	52/82			72/114	
	53/83			73/115	
	54/84			74/116	
	55/85			75/117	
	56/86			76/118	
	57/87			77/119	
	58/88			78/120	
	59/89		`	79/121*	60/96
!	5A/90*	21/33	:	7A/122	3A/58
$	5B/91*	24/36	#	7B/123*	23/35
*	5C/92	2A/42	RVI or @	7C/124*	40/64
)	5D/93	29/41	'	7D/125	27/39
;	5E/94	3B/59	=	7E/126	3D/61
^	5F/95*	5E/94	"	7F/127*	22/34

* Dependent upon language.

TABLE B.7 EBCDIC to ASCII TRANSLATION (Part 2 of 4)

GRAPHIC	EBCDIC hex/dec	ASCII hex/dec	GRAPHIC	EBCDIC hex/dec	ASCII hex/dec
	80/128			A0/160	
a	81/129	61/97	~	A1/161*	7E/126
b	82/130	62/98	s	A2/162	73/115
c	83/131	63/99	t	A3/163	74/116
d	84/132	64/100	u	A4/164	75/117
e	85/133	65/101	v	A5/165	76/118
f	86/134	66/102	w	A6/166	77/119
g	87/135	67/103	x	A7/167	78/120
h	88/136	68/104	y	A8/168	79/121
i	89/137	69/105	z	A9/169	7A/122
	8A/138			AA/170	
	8B/139			AB/171	
	8C/140			AC/172	
	8D/141		[	AD/173	5B/91
	8E/142			AE/174	
	8F/143			AF/175	
	90/144			BO/176	
j	91/145	6A/106		B1/177	
k	92/146	6B/107		B2/178	
l	93/147	6C/108		B3/179	
m	94/148	6D/109		B4/180	
n	95/149	6E/110		B5/181	
o	96/150	6F/111		B6/182	
p	97/151	70/112		B7/183	
q	98/152	71/113		B8/184	
r	99/153	72/114		B9/185	
	9A/154			BA/186	
	9B/155			BB/187	
	9C/156			BC/188	
	9D/157		]	BD/189	5D/93
	9E/158			BE/190	
	9F/159			BF/191	

* Dependent upon language.

TABLE B.7 EBCDIC to ASCII TRANSLATION (Part 3 of 4)

GRAPHIC	EBCDIC hex/dec	ASCII hex/dec	GRAPHIC	EBCDIC hex/dec	ASCII hex/dec
{	C0/192*	7B/123	\	E0/224*	5C/92
A	C1/193	41/65		E1/225	
B	C2/194	42/66	S	E2/226	53/83
C	C3/195	43/67	T	E3/227	54/84
D	C4/196	44/68	U	E4/228	55/85
E	C5/197	45/69	V	E5/229	56/86
F	C6/198	46/70	W	E6/230	57/87
G	C7/199	47/71	X	E7/231	58/88
H	C8/200	48/72	Y	E8/232	59/89
I	C9/201	49/73	Z	E9/233	5A/90
	CA/202			EA/234	
	CB/203			EB/235	
	CC/204			EC/236	
	CD/205			ED/237	
	CE/206			EE/238	
	CF/207			EF/239	
}	D0/208*	7D/125	0	F0/240	30/48
J	D1/209	4A/74	1	F1/241	31/49
K	D2/210	4B/75	2	F2/242	32/50
L	D3/211	4C/76	3	F3/243	33/51
M	D4/212	4D/77	4	F4/244	34/52
N	D5/213	4E/78	5	F5/245	35/53
O	D6/214	4F/79	6	F6/246	36/54
P	D7/215	50/80	7	F7/247	37/55
Q	D8/216	51/81	8	F8/248	38/56
R	D9/217	52/82	9	F9/249	39/57
	DA/218			FA/250	
	DB/219			FB/251	
	DC/220			FC/252	
	DD/221			FD/253	
	DE/222			FE/254	
	DF/223		PAD	FF/255	

* Dependent upon language.

TABLE B.7 EBCDIC to ASCII TRANSLATION (Part 4 of 4)

B.7 Vertical Forms File

The channel.ovr file allows you to customize printer channels (also known as tracks), vertical tab positions, and the first and last printable lines on a page. This replaces the carriage-control tape on the 2780/3780 printer. You may create a channel.ovr file with a standard text editor.

The following example shows the format for a vertical forms control file:

```
channel 1=xx
channel 2=xx[,xx,xx,xx,xx,xx]
[channel 3=xx[,xx...]]
[channel 4=xx[,xx...]]
[channel 5=xx[,xx...]]
[channel 6=xx[,xx...]]
[channel 7=xx[,xx...]]
[channel 8=xx[,xx...]]
[channel 9=xx[,xx...]]
[channel 10=xx[,xx...]]
[channel 11=xx[,xx...]]
channel 12=xx
```

where:

xx	line number from 1 to 132;
channel 1=	First printed line on page;
channel 2=	Channel 2 and vertical tab line(s); (up to 6 lines may be defined);
channel 3=	Optional Channel 3 line(s) (up to 6 lines may be defined);
:	
:	
channel 11=	Optional Channel 11 line(s) (up to 6 lines may be defined);
channel 12=	Last printed line on page.

Note: Channels 9 through 12 are valid only with 3780; they are not valid with 2780.

The following example channel.ovr file uses line 3 as the first print line on the page and line 80 as the last print line on the page, and sets channel 2 and vertical tabs on lines 10, 15, 20, 25, and the channel 3 on line 30. When the printer finishes printing line 80, it automatically skips to line 3 on the next page.

```
channel 1=3
channel 2=10,15,20,25
channel 3=30
channel 12=80
```

See **Table 3.1 Printer Escape Sequence Translations** in **Chapter 3 - 3780Plus Commands** for escape sequence to channel conversions.

If the channel.ovr file does not exist, the defaults are:

1) Skip to Channel 1 (ESC A) and FF perform form feed to top of page, but no automatic form feed and line feed operations will be performed;
2) Skip to Channel 2 (ESC B) through Skip to Channel 12 (ESC L) and unrecognized ESC sequences are translated through the asciiebc.ovr translation table and saved in the file;
3) VT characters perform a single space (CR/LF);

If specific channels are not defined in the channel.ovr file, the defaults are:

1) If channel 1 is not defined, the default first line is 1;
2) If channel 2 is not defined, Skip to Channel 2 (ESC B) and VT perform single space (CR/LF);
3) If channels 3 through 12 are not defined, Skip to Channel 3 (ESC C) through Skip to Channel 12 (ESC L) perform a single space (CR/LF);
4) If channel 12 is not defined, the default page length is line 66;
5) Unrecognized ESC sequences are dropped.

Note: 3780Plus assumes the printer is at the top of form when the first printer file is received. Therefore, if ESC / is received as the first printer characters, 3780Plus will perform a Skip to Channel 1 but not a form feed.

Note: The default vertical forms file name may be changed (see **B.5 Video Display File** for details).

B.8 Baud Rate Definition File

SYNCcable+ supports the asynchronous speeds of 57,600 bps (-B 57600), and 115,000 bps (-B 115000). There are no standard IOCTL baud rate definitions for these higher speeds. For UNIX-based systems and add-on multiport boards or terminal controllers that support these rates, the baud.ovr file must be created to specify IOCTL baud rate definitions. Before creating a baud.ovr file, you may call Cleo's technical support department to see if we have a baud.ovr file for your system/port.

The baud.ovr file has the following format: [RATE*x*=]*baud_rate*,*IOCTL_definition*

where:

RATE*x*= is an optional rate number. This is unused by 3780Plus.

baud_rate is the baud rate specified with the -B command line option.

IOCTL_definition is the IOCTL baud rate definition. The definition may be specified in octal (prefix the number with zero), decimal (no prefix) or hexadecimal (prefix the number with 0x). The baud rate definitions are found in a terminal information file:

Standard: /usr/include/sys/termio.h.
RS/6000: /usr/include/termios.h.
SUN: /usr/sys/termios.h.

See your system manual for the location of your terminal information file. For systems with add on terminal ports, refer to your terminal port manual for IOCTL baud rate definitions.

Following is an example baud.ovr file for an IBM 386/486 running SCO UNIX with DigiBoard's DigiCHANNEL PC/Xe or Comtrol's RocketPort 4J multiport serial board:

```
57600,01
115200,03
```

(Note, to run the higher baud rates on the DigiCHANNEL PC/Xe you must issue the following command: ditty /dev/tty*xx* fastbaud)

Following is an example baud.ovr file for the RS/6000 running AIX with a Central Data scsiTerminalServer model st-1800 port:

```
RATE1=4800,0x9
RATE2=9600, 0xa
RATE3=19200,0xb
RATE4=38400,0xc
RATE5=57600,0xd
RATE6=115200,0xf
```

Note, because this Central Data port redefines all the baud rates, the baud rates 4800, 9600, 19200, and 38400 must be defined in addition to 57600 and 115200.

If either the machine or the baud.ovr file do not support the speed specified with the -B option, 3780Plus will post an "Unsupported Baud Rate" message and exit with exit code 26. If the machine supports the speed but cannot handle the traffic, the communications will be slowed by errors (use the XX -S command to determine error counts).

Appendix C.
Multipoint Operation and Device Selection

This appendix contains information on the following topics:

- Multipoint operation
- Device selection

C.1 Multipoint Operation

3780Plus supports the IBM 2780/3780 multipoint option. In a multipoint configuration, the host mainframe is generally designated as the primary terminal, and all transmissions and receptions occur through this node. Other terminals on the multipoint line are designated as secondary terminals and are identified by unique addresses. The address for a secondary terminal may be assigned with the COnfig Terminal Identification parameter. See **2.6 COnfig - Display or Change Configuration** in **Chapter 3 - 3780Plus Commands** and **Chapter 2 - Configuration** for more information on setting the Terminal ID.

C.1.1 3780 Multipoint

3780 multipoint operation requires a four character address (*XXxx*) for secondary terminal identification. The secondary terminal receives information when it is selected by the primary terminal and transmits information when it is polled by the primary terminal.

The selection sequence for 3780 multipoint is:

x x [*device_select*] ENQ

where:

x is a lower case alphabetic character identifying the secondary terminal that is to receive data.

device_select is an optional selection code representing the printer or punch to be selected (see **Table C.1 3780 Device Selection Characters**).

The polling sequence for 3780 multipoint is:

X X [*device_select*] ENQ

where:

X is an upper case alphabetic character identifying the secondary terminal that is to transmit data.

device_select is an optional selection code representing the reader to be polled (see **Table C.1 3780 Device Selection Characters**).

C.1.2 2780 Multipoint

2780 multipoint operation requires a single character address (upper or lower case) for secondary terminal identification. Both polling and selection sequences send this character followed by a device selection code indicating whether the terminal is being polled or selected:

x device_select ENQ

where:

x is the terminal address.

device_select is a selection code representing the printer or punch to be selected or the reader to be polled (see **Table C.2 2780 Device Selection Characters**).

C.2 Device Selection

Both the 2780 and 3780 terminals support printer, card punch, and card reader peripheral devices. Each device has an identifier which enables data to be routed to or from the appropriate peripheral.

C.2.1 3780 Device Selection

In 3780 point-to-point mode, the printer is selected when a Device Control 1 (DC1) character follows the Start of Text (STX) character in the first text block. The printer will receive the incoming files until an End of Transmission (EOT) is received. Punch selection codes, Device Control 2 (DC2) and Device Control 3 (DC3), are ignored and 3780Plus continues to receive files to the previously selected device (screen, disk, or printer).

	Point-to-point Mode	**Multipoint Mode**
Printer	DC1 (0x11)	DC1 (0x11)
Punch	DC2 (0x12)	DC2 (0x12)
	or DC3 (0x13)	or DC3 (0x13)
Reader		0, 6, or 7

TABLE C.1 3780 DEVICE SELECTION CHARACTERS

In 3780 multipoint mode, the device selection sequence is:

X X device_select ENQ

and the device polling sequence is:

x x device_select ENQ

where:

X X and *x x* are the terminal addresses described in the previous section.

device_select is a selection code representing the printer or punch to be selected or the reader to be polled (see **Table C.1 3780 Device Selection Characters**).

As in point-to-point mode, 3780Plus ignores punch selection characters and routes received files to the previously selected device. The printer and punch may be selected but not polled. The reader may be polled but not selected.

C.2.2 2780 Device Selection

In 2780 point-to-point mode, the printer is selected when an escape (ESC) sequence follows the Start of Text (STX) or Record Separator (IUS) character in the first text block. The printer will receive the incoming files until an End of Transmission (EOT) is received. As in 3780 device selection, punch codes are ignored in 2780 point-to-point and multipoint modes.

	Point-to-point Mode	**Multipoint Mode**
Printer	ESC / (0x27 0x61) ESC S (0x27 0xE2) ESC T (0x27 0xE3) ESC A (0x27 0xC1) ESC B (0x27 0xC2) ESC C (0x27 0xC3) ESC D (0x27 0xC4) ESC E (0x27 0xC5) ESC F (0x27 0xC6) ESC G (0x27 0xC7) or ESC H (0x27 0xC8)	3
Punch	ESC 4 (0x27 0xF4)	4
Reader		6

TABLE C.2 2780 DEVICE SELECTION CHARACTERS

In 2780 multipoint mode, the device selection sequence for the printer is:

x 3 ENQ

and the device selection sequence for the punch is:

x 4 ENQ

The device polling sequence is:

x 6 ENQ

where:

x is the terminal address.

Appendix D.
Glossary

This appendix contains definitions of terms used within this manual.

2780 Data Transmission Terminal Introduced in the late 1960's to enable large amounts of data to be transmitted over phone lines to an IBM mainframe or to another 2780 device. The 2780 terminal could be configured with a card reader, a card punch, and a printer. Data files were transmitted to the remote device by means of the card reader. Received data files were directed to the card punch or line printer.

3780 Data Communications Terminal An improved version of the 2780 terminal introduced in 1972. The 3780 terminal included a terminal console in addition to the card reader, card punch, and printer of 2780. 3780 also offered improved speed and flexibility over 2780.

API Application Program (or Programmer's) Interface. A programming language that allows a user-written application program to access the functions of a hardware or software system.

ASCII American Standard Code for Information Interchange. Pronounced "asky." A seven bit code allowing for 128 different bit patterns representing characters, numbers, graphics, and control codes. Some systems use the remaining 128 bit patterns to represent additional extended graphical characters.

asynchronous transmission Transmission in which the data bits are transmitted at a fixed rate. Individual start and stop bits must surround each byte. 3780 may be configured to use asynchronous transmission to autodial.

autodial Dialing performed by a modem without user intervention. This dialing is usually initiated by a signal or sequence of characters from an attached computer. 3780Plus supports UDS BSC, SADL, V.25bis, AT command set, and DTR-controlled autodialing.

baud A unit of signaling speed equal to the number of discrete conditions or signal elements per second. If each signal event represents only one bit condition, baud rate equals bps.

Bell 201 AT&T standard modem providing full-duplex (Bell 201B) or half-duplex (Bell 201C) synchronous data transmission at 2400 bps.

Bell 208 AT&T standard modem providing full-duplex (Bell 208A) or half-duplex (Bell 208B) synchronous data transmission at 4800 bps.

Bell 209 AT&T standard modem providing half-duplex synchronous data transmission at 9600 bps.

Bell 212 AT&T standard modem providing full-duplex asynchronous or synchronous data transmission at 1200 bps.

binary transmission Data transmission that has no possibility of interference with data link control. May be used to send any type of file, including executables and other non-ASCII files. Also referred to as transparent transmission. File(s) are normally sent "as is" with no conversion to EBCDIC.

blind dial With an autodial modem, to begin the dialing process without first detecting a dial tone.

bps Bits per second. A unit of data transmission rate.

BSC Binary Synchronous Communication. An IBM communications protocol which uses a defined set of control characters for synchronized transmission of binary coded data.

CCITT	Comite Consultatif International Telegraph-ique et Telephonique. Committee for international communications standards.

CCITT V.22 International recommendation defining standards for modems providing full-duplex asynchronous or synchronous data transmission at 1200 bps.

CCITT V.22 bis International recommendation defining standards for modems providing full-duplex asynchronous or synchronous data transmission at 2400 bps.

CCITT V.24 International recommendation defining interchange circuits between data communications and data terminal equipment. Similar to EIA RS-232C.

CCITT V.25 bis International recommendation defining standards for establishing a connection between a serial automatic calling data station and an automatic answering data station on a switched phone line.

CCITT V.26 bis International recommendation defining standards for modems providing half-duplex synchronous data transmission at 2400 bps. Similar to Bell 201.

CCITT V.29 International recommendation defining standards for modems providing half-duplex synchronous data transmission at 9600 bps.

CCITT V.32 International recommendation defining standards for modems providing full-duplex asynchronous or synchronous data transmission at 9600 bps.

configuration file File created and used by 3780Plus to modify default configuration parameters. Configuration parameters include: protocol type, line type, terminal type, terminal id, transmission record size, transmission blocking factor, space compression, new line suppression, repeat limit, retransmission limit, wait limit, delay limit, bid limit, idle limit, receive limit, modulation type, RTS/CTS delay, equalizer, and dialing method.

control character A non-printing character designed to send a special signal (like a carriage return or line feed) to a remote device.

crc-16 16 bit cyclic redundancy check. An error detection scheme in which two eight bit byte checks are accumulated using the polynomial $x^{16}+x^{15}+x^{2}+1$. Also referred to as the BCC (block check character).

DCE Data Communications Equipment. Equipment that establishes, maintains, and terminates a data transmission connection. Example: modem.

DTE Data Terminal Equipment. Equipment that transmits and/or receives data. Example: PC with synchronous interface card.

DTMF Dual-Tone Multi-Frequency. The method of dialing used by push-button phones which generate two output tones that represent each number.

EBCDIC Extended Binary Coded Decimal Interchange Code. An eight bit character code allowing for 256 different bit patterns. EBCDIC is used in IBM and IBM-compatible mainframe computer systems.

EIA Electronic Industries Association. A standards organization in the USA specializing in the electrical and functional characteristics of interface equipment.

emulate	To imitate or act like. For example, 3780Plus running on an IBM PC emulates an IBM 3780 computer system.

equalization	A modem option which allows compensation for poor quality phone lines.
escape sequence	An ESC control character followed by a limited number of other characters providing additional control functions.
file transfer	The process of transmitting data files between computers.
full duplex	The ability to transmit and receive data at the same time.
half duplex	The ability to transmit or receive but not both at the same time.
interactive execution	In 3780Plus, entering one command at a time from within the 3780Plus program.
job file	File of commands created and used by 3780Plus to enable unattended operation. See also Scripting Command Language.
leased line	A telephone line reserved for the exclusive use of a leasing customer without interexchange switching arrangements (also called private, non-switched, or dedicated line).
log file	File created by 3780Plus listing all 3780Plus transactions.
logon	The process by which a user initiates contact with a computer system and identifies himself or herself as someone authorized to use the system.
modem	Modulator-demodulator. A device used to convert digital electronic signals produced by the computer into audio signals that can be sent over a phone line and to convert audio signals back to digital signals.
monitor file	File created by 3780Plus listing all protocol characters being transmitted and received.
multipoint line	A single communications line interconnecting several stations. Use of this type of line usually requires a polling mechanism to address each terminal with a unique address code. Also referred to as a multidrop line.
non-transparent transmission	Data transmission that may interfere with data link control. Also referred to as text transmission. Usually used for transmitting text files with valid ASCII characters. File(s) are normally translated from the ASCII character set to the EBCDIC character set before transmission and reconverted to ASCII upon reception.
permissive phone line	A standard two-wire, half-duplex, dial-up telephone line with a maximum output level of -9 dBm.
piggybacking	Transmitting consecutive files without an intervening EOT.
polling sequence	A series of characters sent by the controlling (primary) computer on a multipoint line to request information from a secondary computer.
point-to-point line	A connection between two, and only two, terminals/computers.

primary terminal The computer (usually a host mainframe) controlling all computer transmissions and receptions on a multidrop line.

programmable phone line A two-wire, half-duplex, dial-up telephone line with a maximum output level set externally by the phone company.

protocol A formal set of conventions governing the formatting and relative timing of message exchange between two communicating systems.

pulse dial The method of dialing used by rotary dial phones which open and close the local loop circuit at timed rates.

RJ-11 A four wire modular phone cable generally used on permissive (standard) phone lines. May end in a RJ-11 or RJ-45 connector. Note: the RJ-45 connector is larger than the RJ-11 connector.

RJ-45 An eight wire modular phone cable generally used on programmable and private phone lines.

RJE Remote Job Entry. Remote batch oriented access to the host computer through file transfer.

RS-232C EIA standard describing the signals, connectors, and pin locations for the interface between data terminal equipment (DTE) and data communications equipment (DCE).

Scripting Command Language File of commands created and used by 3780Plus to enable unattended operation. See also Job File.

secondary terminal A computer on a multidrop line identified by a unique address (terminal id).

selection sequence A series of characters sent by the controlling (primary) computer on a multipoint line to select the secondary computer to receive data.

serial line monitor A hardware or software device which captures and displays or saves all received and transmitted data on the communications line.

space compression/ expansion Allows spaces to be removed before transmission and reinserted during reception for increased data throughput in non-transparent mode.

status line In 3780Plus, a line posted after each file is transmitted or received stating the file name, completion status code, and the number of data blocks processed.

switched line A common telephone line capable of completing a dialed, point-to-point connection between two stations (also called dial-up, public, or non-dedicated line).

synchronous transmission Transmission in which both the data characters and the individual bits are transmitted at a fixed rate, with the transmitter and receiver being synchronized. This eliminates the need for individual start and stop bits surrounding each byte. 3780 uses synchronous transmission.

terminal id A unique address (usually 1 to 4 characters in length) which identifies a secondary terminal on a multipoint line.

multipoint line.

text transmission Data transmission that may interfere with data link control. Also referred to as non-transparent transmission. Usually used for transmitting text files with valid ASCII characters. File(s) are normally translated from the ASCII character set to the EBCDIC character set before transmission and reconverted to ASCII upon reception.

tone dial The method of dialing used by push-button phones which generate two output tones that represent each number.

transparent transmission Data transmission that has no possibility of interference with data link control. May be used to send any type of file, including executables and other non-ASCII files. Also referred to as binary transmission. File(s) are normally sent "as is" with no conversion to EBCDIC.

unattended execution In 3780Plus, the execution of a job file to run 3780Plus commands without user intervention.